Vol.26 No.6

June 1991

Food Technology Abstracts

Central Food Technological Research Institute, Mysore.

National Information System for Science and Technology
Department of Scientific and Industrial Research, New Delhi.

NICFOS

WHAT IS NICFOS

The National Information Centre for Food Science and Technology (NICFOS), is a discipline oriented information service in Food Science, Technology and Nutrition. Set up in October 1977 at the Central Food Technological Research Institute (CFTRI), Mysore, it is one of the Sectoral Information Centres under the NISSAT of the Govt. of India, Dept. of Scientific and industrial Research.

NICFOS's services are generated by a band of professional specialists and backed up by reprographic, micrographic, printing and computer facility. Its services include publication of R & D and industry oriented current awarness services, answering technical inquries, reprography and training.

NICFOS BASE

The well-equipped Library of CFTRI with its collection going back to 1950 function as a clearing house for information on all aspects of food area. With its large collection of books, monographs, conference proceedings, bound volumes of periodicals, standards, patents, reports, theses, microforms and 600 current periodicals it can provide you with the latest information on any subject area of food. The library also serves as a training centre in different aspects of information handling and use besides guiding in setting up of new libraries in the area of food science and technology.

BIBLIOGRAPHICAL SERVICE

Bibliography on any specific subject can be compiled and supplied after searching the International Databases (FSTA, Chem. Abstracts, etc.). Tariffs depend on whether with/without abstracts, search perriod and the subject area to be covered. The charges (for hard copy) are Rs.20/- per page if it is only titles; Rs.40/- per page if it is annotated bibliography; minimum charge is Rs.100/- per bibliography. The bibliography can also be supplied on floppy disks with wordstar or dBase formats. The charges is Rs.500/- plus compilation charges as given above. Delivery time is 2 to 4 months depending upon the volume.

PHOTOCOPY (XEROX) OF PUBLISHED SCIENTIFIC/TECHNICAL ARTICLES

The National Information Centre for Food Science and Technology (NICFOS) at the Central Food Technological Research Institute, Mysore, has got a good collection of scientific and other periodicals collected over the years in the area of Biological Sciences. If any article is needed for reference work, we will supply one copy from our wealth of collections. The cost of providing the copies is Rs.2/- per page (minimum charge Rs.10.00). Please take advantage of this facility to overcome your problem in getting original articles.

All correspondences regarding these services should be addressed to:

The Area Co-ordinator

FOSTIS, CFTRI,

Mysore 570 013,

Karnataka, India.

FOOD TECHNOLOGY ABSTRACTS

Vol.26 No.6
June 1991

Compiled and edited by :
B. Vasu
C. S. Anita
Geetha Seetharam
S. R. Ananthnarayan

National Information Centre For Food Science And Technology
Central Food Technological Research Institute,
Mysore - 570 013, India

Abstractors contributing to FTA

AR	Abdul Rahim	MCV	M. C. Varadaraj
BAP	B. Aravinda Prasad	MNK	M. N. Krishnamurthy
BHSR	B. H. Subba Rau	MSP	M. S. Prasad
BV	B. Vasu	N	Nasirullah
CMS	C. M. Sowbhagya	NGKK	N. G. k. Karanth
CSA	C. S. Anita	NGM	N. G. Malleshi
DNR	D. Narasimha Rao	NK	N. Keshava
GAR	G. A. Ravishankar	PHR	P. Haridas Rao
GS	Geetha Seetharam	SGB	S. Godavari Bai
JSS	J. S. Sandhu	SRA	S. R. Ananthnarayan
KAR	K. A. Ranganath	SYR	S. Yella Reddy
KMA	K. M. Appaiah	VKR	V. Krishnaswamy Rao

Annual Subscription : Rs.250.00. US $ 85.00. Single Copy : Rs.25.00

CONTENTS

		Page No
General	...	293
Food Processing	...	293
Food Packaging	...	293
Food Engineering and Equipment	...	293
Energy in Food Processing	...	-
Food Chemistry and Analysis	...	294
Food Microbiology and Hygiene	...	295
Biotechnology	...	296
Tissue Culture	...	296
Food Additives	...	296
Cereals	...	297
Millets	...	298
Pulses	...	299
Oilseeds and Nuts	...	301
Tubers and Vegetables	...	302
Fruits	...	303
Confectionery, Starch and Sugar	...	305
Bakery products	...	306
Milk and Dairy products	...	307
Meat and Poultry	...	314
Seafoods	...	319
Protein Foods	...	322
Alcoholic and Non-alcoholic Beverages	...	322
Fats and oils	...	324
Spices and Condiments	...	325
Sensory Evaluation	...	-
Food Storage	...	325
Infestation Control and Pesticides	...	326
Biochemistry and Nutrition	...	326
Toxicology	...	328
Food Laws and Regulations	...	-
Index		329

ABBREVIATIONS

A	ampere
AAS	atomic absorption Spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylenediaminetetra acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycle/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lb	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt	.molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [$kg\ m/s^2$]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
p	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	south, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

Language of text	
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
spanish	Es
swedish	Sv

GENERAL

1244

Pearson (AM). **Muscle growth and exercise.** *CRC Critical Reviews in Food Science and Nutrition* 29(3): 1990: 167-196

Review. 240 references. SRA

1245

McGlasson (WB). **Role of postharvest technology in the marketing of horticultural produce.** *Food Australia* 42(4): 1990: 184-186

1246

Moberg (L). **Good manufacturing practices for refrigerated foods.** *Journal of Food Protection* 52(5): 1989: 363-367

FOOD PROCESSING

1247

Lacey (RW) and Dealler (SF). **Food irradiation - unsatisfactory preservatives.** *British Food Journal* 92(1): 1990: 15-17

FOOD PACKAGING

Packaging materials

1248

Schofield (J). **Microwave magic.** *Food* 11(1): 1989: 38-39, 41

The author reports briefly the trends in packaging materials for microwave foods. Advantages and disadvantages are also covered. BV

1249

Gopal (TKS) and Hridayanathan (C). **Effect of quality of kraft paper on the physical properties of corrugated fibreboard.** *Fishery Technology* 28(1): 1991: 73-79

Kraft paper samples were collected from corrugated fibreboard (CFB) box fabricators from 4 different factories in and around Cochin. Grammage, caliper, bursting strength, ring stiffness, tearing strength, tensile strength and elongation at break in machine and cross direction were evaluated. It is observed that all these strengths except tearing strength are dependant and tearing strength is independent of the virginity of the kraft paper. SRA

1250

Kim-Kang (H). **Volatiles in packaging materials.** *CRC Critical Reviews in Food Science and Nutrition* 29(4): 1990: 255-271

This article summerises volatile compounds identified in a var. of packaging materials, as well as the precursors of the major volatile components. Covers migration theory, methodology for testing polymer odour and odour contributors (sensory evaluation, instrumental analysis), volatile compounds identified in specific packaging materials (solvents, monomers, polyethylene terepthalate, rubber articles, polyethylene, ionomers, polyvinylchloride, polyester trays, plastic laminates, gelatin, paper and paperboard, aseptic packages, glassine packages, cans; irradiation-induced volatiles and others). 157 references. SRA

FOOD ENGINEERING AND EQUIPMENT

1251

Fryer (P) and De Alwis (A). **Validation of the APV ohmic heating process.** *Chemistry and Industry* (19): 1989: 630-634

Engineering

1252

Sharp (AK). **The use of thermocouples to monitor cargo temperatures in refrigerated freight containers and vehicles.** *CSIRO Food Research Quarterly* 49(1/2): 1989: 10-18

1253

Bell (GA) and Mellor (JD). **Adsorption freeze-drying.** *Food Australia* 42(5): 1990: 226-227

A novel freeze-drying process which significantly cuts the cost of producing freeze-dried foods which at the same time improving the product quality is presented. Freeze-drying at temp. which can be controlled at any desired level, removal of water vapour by a cooled adsorbent, whose performance improves with reduced temp., reduced risk of food thawing during the vacuum pump-down, maintenance of low temp. throughout the drying process and until the product is almost completely dry, reduced equipment cost, reducing operating cost and lower energy requirements are the advantages of this process. BV

Equipments

1254
Richardson (P). **Which equipment?.** *Food* 11(1): 1989: 33-35

The author explains the type of processing equipment to be used. BV

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1255
Roy (GM). **The applications and future implications of bitterness reduction and inhibition in food products.** *CRC Critical Reviews in Food Science and Nutrition* 29(2): 1990: 59-71

This review covers U. S. retail sales of bitter palatables (bitter palatables masked by consumer or producer with sugar or dressings), taste receptor models (sweet vs bitter), applications (citrus industry, triterpenes, peptides, sugars, grains, xanthines (tea, coffee, cocoa, and chocolate), salt and umami, pharmaceuticals), taste mechanisms, science and prospects for the future. 82 references. SRA

Chemistry(Analytical)

1256
Rodriguez (MLP), Bosch (NB) and Mata (MG). **The use of diastase from malt as coadjustant agent for clearing: Application in spectrophotometric determination of nitrites and nitrates in dry foodstuffs.** *Anales de Bromatologia* 41(2): 1989: 413-420 (Es)

1257
Khurana (AL). **Food analysis on silica-bond HPLC phases.** *CRC Critical Reviews in Food Science and Nutrition* 29(3): 1990: 197-235

HPLC analysis of food on various silica-bonded phases has been described. Technical and theoretical aspects of the materials such as normal-, reverse-, ion-exchange-, affinity-, chiral-, size-exclusion-, and ion-phases have been discussed. Special problems such as mobile phase or solvent-selection, selectivity and mechanisms of resolution on these bonded phases have been mentioned. Application of various bonded materials such as amino, cyano, diol, amino-cyano, C-18, C-8, anion-exchangers, strong and weak-cation exchangers, chiral and enzyme bound affinity phases to analyse and determine food components such as carbohydrates, food colours and pigments, flavours, proteins, vitamins and toxins has been described. AS

1258
Hills (BP), Takacs (SF) and Belton (PS). **A new interpretation of proton NMR relaxation time measurements of water in foods.** *Food Chemistry* 37(2): 1990: 95-111

The transverse water proton relaxation in 3 widely differing types of sample, native lysozyme solutions, skimmed milk and apple, has been analysed. The relaxation times show characteristic variations with CPMG pulse spacing and morphology which can be interpreted in terms of chemical exchange and molecular diffusion without recourse to popular concepts such as various amounts and types of 'bound' water. Our results suggest that transverse water proton relaxation might be used as a sensitive probe of changes in water distribution during cellular growth and differentiation, freeze-thawing and dehydration-rehydration in food systems. AS

1259
Armstrong (DW), Chang (C-D) and Li (WY). **Relevance of enantiomeric separations in food and beverage analyses.** *Journal of Agricultural and Food Chemistry* 38(8): 1990: 1674-1677

A series of new derivatized cyclodextrins have been developed for use as chiral stationary phases in capillary gas chromatography. As a result, a large number of the enantiomeric components in food and beverage products can be resolved relatively quickly and easily. The study focuses on compounds other than amino acids (e.g., malic acid, lactic acid, tartaric acid, esters, alcohols, lactone flavours or fragrances, and so on). The ability to separate and quantitate enantiomers at low levels should be useful for detecting adulterated products, for evaluating fermentation processes, and for the accurate characterization of enantiomeric flavour components, growth regulators, pesticides, and herbicides as well as their chiral environmental degradation products and metabolites. AS

1260
Deotale (MY), Patil (MN) and Adinarayaniah (CL). **Thin layer chromatographic detection of**

kokum-butter in cocoa-butter. *Journal of Food Science and Technology (India)* 27(4): 1990: 230

A fairly simple thin layer chromatographic method has been developed to detect kokum-butter in cocoa-butter. Kokum-butter appeared as bluish green spot under U. V. light at Rf 0.5 - 0.6 both, when present alone or in the mixture with cocoa-butter, while the latter did not show up as a spot. The method permits the detection of kokum-butter upto 5% when mixed with cocoa-butter. AS

FOOD MICROBIOLOGY AND HYGIENE

1261
Gare (NF). **Applications of immunoassays in the food industry.** *Food Australia* 42(8): 1990: 394-395

1262
Esteban (MA), Alcala (M), Marcos (A), Fernandez-Salguero (J), De Fernando (GDG), Ordonez (JA), Sanz (B). **Water activity of culture media used in food microbiology.** *International Journal of Food Science and Technology* 25(4): 1990: 464-468

Ethyl alcohol

1263
Alterthum (F) and Ingram (LO). **Efficient ethanol production from glucose, lactose, and xylose by recombinant *Escherichia coli*.** *Applied and Environmental Microbiology* 55(8): 1989: 1943-1948

Microorganisms

Bacteria

1264
Reinheimer (JA), Demkow (MR) and Candioti (MC). **Inhibition of coliform bacteria by lactic cultures.** *Australian Journal of Dairy Technology* 45(1): 1990: 5-9

1265
Cousin (MA), Dufrenne (J), Rombouts (FM) and Notermans (S). **Immunological detection of *Botrytis* and *Monascus* species in food.** *Food Microbiology* 7(3): 1990: 227-235

Lactobacillus acidophilus

1266
Batish (VK), Ram Lal and Sunita Grover. **Studies on environmental and nutritional factors on production of antifungal substance by *Lactobacillus acidophilus* R.** *Food Microbiology* 7(3): 1990: 199-206

The optimal incubation temp. and period for the maximal production (27 units ml $^{-1}$) of antifungal substance (AFS) by *Lactobacillus acidophilus* R. in Elliker's broth was 30 C and 48 h. Prolonged incubation led to diminished activity. The pH optima for the production of AFS ranged from 6.8 - 7.6, at which 24.16 units ml $^{-1}$ of AFS were produced. Although incorporation of yeast extract in the growth medium was stimulatory at 1.0%, beef extract and casamino acid stimulated AFS production at the level of 1.5%. Tryptone, on the otherhand, was stimulatory at the level of 2.0%. Similarly, addition of glucose to the basal medium at the level of 0.5 - 1.0% enhanced the production of AFS (29 units ml $^{-1}$). Beyond 2.0% it was inhibitory. There was an appreciable increase in production of AFS with the concomitant increase (0.5 - 3.5%) in the salt concn. in the growth medium. Calcium chloride was also stimulatory at the 0.1% level, at which AFS production increased to 35 units ml $^{-1}$. urther increase in the Ca concn. was inhibitory. Contrary to this, magnesium chloride and manganese sulphate were stimulatory at low levels (0.02 and 0.005%, resp.) AS

Leuconostoc oenos

1267
Champagne (CP), Gardner (N) and Doyon (G). **Production of *Leuconostoc oenos* biomass under pH control.** *Applied and Environmental Microbiology* 55(10): 1989: 2488-2492

Listeria monocytogenes

1268
Mustapha (A) and Liewen (MB). **Destruction of *Listeria monocytogenes* by sodium hypochlorite and quaternary ammonium sanitizers.** *Journal of Food Protection* 52(5): 1989: 306-311

Pediococcus

1269
Bhowmik (T) and Marth (EH). **β-Galactosidase of *Pediococcus* species: Induction, purification and partial characterization.** *Applied Microbiology and Biotechnology* 33(3): 1990: 317-323

Shigella flexneri

1270

Zaika (LL), Engel (LS), Kim (AH) and Palumbo (SA). **Effect of sodium chloride, pH and temperature on growth of *Shigella flexneri*.** *Journal of Food Protection* 52(5): 1989: 356-359

Fungi

Mushrooms

1271

Ghosh (N) and Chakravarty (DK). **Predictive analysis of the protein quality of *Pleurotus citrinopileatus*.** *Journal of Food Science and Technology (India)* 27(4): 1990: 236-238

Pleurotus citrinopileatus, was analysed for amino acid comp. to determine its protein quality as compared to whole egg and FAO reference protein. An assessment of protein quality standards (EAA-index, amino acid score, biological value and nutritional index) indicated good nutritional significance of the test mushroom. Also, the protein quality standard was compared with *P. sajor-caju* and other foodstuffs and its position was assigned in the chronological order of nutritional status. AS

Yeasts

Kluyveromyces marxianus

1272

Smith (AB) and Pyle (DL). **Two-dimensional electrophoretic analysis of endopolygalacturonases produced by *Kluyveromyces marxianus*.** *Journal of Food Biochemistry* 14(4): 1990: 273-281

BIOTECHNOLOGY

1273

Smith (B) and Perry (M). **Analytical techniques for biotechnology.** *Chemistry and Industry* (18): 1990: 563-567

Biochemical (electrophoresis, amino acid analysis and oligosaccharide analysis) and biophysical techniques and immunoassay techniques are discussed with reference to biotechnological industry products. BV

1274

Maryanski (JH). **Special challenges of novel foods (biotechnology).** *Food Drug Cosmetic Law Journal* 45(5): 1990: 545-550

TISSUE CULTURE

1275

Ravishankar (GA) and Venkataraman (LV). **Food applications of plant cell cultures.** *Current Science* 59(19): 1990: 914-920

This paper gives an overview on the use of the plant tissue and cell culture in the improvement of quality and quantity of food materials derived from conventional and nonconventional sources of plants. Improvement in nutritive value, reduction/elimination of antinutritional factors, modification of agronomic traits, disease elimination/resistance, haploids/protoplasts, mass propagation, production of phytochemicals (food colours, food flavours, sweeteners, and other products), and novel compounds, processes and products are covered. 95 references. BV

FOOD ADDITIVES

Antioxidants

1276

Wurtzen (G). **Shortcomings of current strategy for toxicity testing of food chemicals.Antioxidants.** *Food and Chemical Toxicology* 28(11): 1990: 743-745

1277

Namiki (M). **Antioxidants/antimutagens in food.** *CRC Critical Reviews in Food Science and Nutrition* 29(4): 1990: 273-300

Recent advances in the search for natural antioxidants, their chemistry and their biological function at the cellular and body level are reviewed, including studies on antimutagenicity of antioxidative food constituents and natural substances. This review covers active oxygen species and formation of lipid peroxides (triplet oxygen and active oxygen); active oxygen radical species and induced effects-mutagenesis, carcinogenesis, aging and others; function of antioxidants in food and biological system; chem. and physicochemical evaluation of antioxidant activity; evaluation of antioxidants in model biological systems; screening of natural antioxidants; newer natural and food related antioxidants (sesame, rice, spices, flavonoids and tea catechins, tannins, leaf wax, porphyrin-related

substances and Maillard reaction products); action of antioxidants in model biological system; and antioxidative vs antimutagenic activity (desmutagens, bio-antimutagens). 203 references. SRA

Preservatives

1278

Arens (BM) and Gertz (C). **Determination of preservatives - Survey by a working party of the DGF, 110th report:German standard methods for investigation of fats, fatty products, tensides and related materials, 83rd report:.Analysis of fat-rich foods. IV.** *FAT Science Technology* 92(3): 1990; 107-109 (De)

CEREALS

1279

Anon. **Extruded snack foods: Starch to the rescue.** *Food Manufacture* 65(9): 1990; 21, 23

1280

Arya (SS). **Grain based snack and convenience foods. Part I.** *Indian Miller* 21(4): 1991; 6-16

In India a large number of grain based snack foods are either prepared by housewives or manufactured by small scale artisans/industries or by food service establishments. These have been defined breifly, their qualities described and the shelf-life indicated. The products covered are shelf stable fried products like shaker paras, namkeen paras, khara sev, chakli, tengolal, muchorai, kodbale; fried dhals; moist food products like samosha, cutlets, vada, pakora, kachori and bhaji; popped or puffed cereals like kheel, khoi, aralu, nelpuri, dhani and satu; expanded cereals like murmura, puri and muri; beaten rice products like poha, avalakki, and chivda; and extruded foods and fermented foods of various types. KAR

1281

Skerritt (JH) and Hill (AS). **Monoclonal antibody sandwich enzyme immunoassays for determination of gluten in foods.** *Journal of Agricultural and Food Chemistry* 38(8): 1990; 1771-1778

The development and properties of two-site ('sandwich') enzyme immunoassays for gluten in foods, based on monoclonal antibodies to heat-stable w-gliadins and related prolamines from wheat, rye and barley are described. The complete assay requires under 2 h when precoated microwells are used. The effects of altering component antibodies, gluten extraction conditions, and solvent on assay performance are described. Quantitative results were obtained by using a simple one-step extraction procedure with 40% ethanol over a very wide range of gluten contents (0.015 - 10%). The method was developed for the quantitative analysis of gluten in virtually all types of foods, whether raw, cooked, or processed. AS

Rice

Rice bran

1282

Saunders (RM). **The properties of rice bran as a foodstuff.** *Cereal Foods World* 35(7): 1990; 632-636

This article briefly covers sources of rice bran, stabilization, comp., effect on cholesterol, laxative effect, uses, recommended industry standard and defatted rice bran. BV

Wheat

1283

Syed (HM), Rathi (SD), Sawate (AR) and Surve (VD). **Studies on physico-chemical and milling characteristics of few wheat cultivars.** *Indian Miller* 21(1): 1990; 42, 44-45, 47-50

Wheat var. HD-2189, N-59, and CC 464 grown at Marathwada Agricultural Univerisity, Parbhani, India were studied. Water absorption by whole wheat flour was max. in HD-2189 and N-59; protein content of all the 3 var. were in the range of 11.55 to 11.66%. Dry gluten of atta and flour was higher in CC 464; differences in ash and crude fat content was marginal. Diastatic activity (mg maltose/10 g) was 239. 5 in HD-2189, 262.4 in N-59 and 224.6 in CC 464. Sedimentation values did not vary much in these var. In the flour, ash content was 0.48% in CC 464, 0.58% in N-59 and 0.53% in HD-2189. The % calcium of total ash was almost doubled in white flour compared to whole wheat flour in each var. Phytic phosphorous (mg/100 g % total ash) was higher in whole meal than in white flour. It was 146.48 for HD-2189, 150.59 for N-59 and 130.03 for CC 464 in the whole meal. The difference in hectolitre wt. of different wheat var. was small. The flour yield was 60% in CC 464, 53.0% in HD-2189, and 52.0% in N-59. The . CC 464, yielded shorts of 18% which is lowest and bran of 21% which is highest compared to HD-2189 and N-59. The atta extraction rate was 91.5 - 92.5% in all 3 var. KAR

1284

Buckley (DJ), Lukow (OM), Lalonde (JLM) and Woods (SM). **A multilevel computer system for**

dough quality analysis and report distribution. *Cereal Foods World* 35(5): 1990: 472-474, 477-478

1285

Lupano (CE) and Anon (MC). **Drying of NaF alter viability and soluble proteins of germinating wheat seeds.** *Journal of Food Biochemistry* 14(4): 1990: 293-306

1286

Neelam Singh, Usha (MS) and Chauhan (GS). **Evaluation of some U. P. hill wheats for their physical, chemical, rheological and breadmaking characteristics.** *Journal of Food Science and Technology (India)* 27(4): 1990: 198-201

The Uttar Pradesh (U.P.) hill wheats had lower thousand kernel wt. and higher hecto-litre wt. with lesser extraction rate as compared to improved var. of wheats. Max. protein content was exhibited by hill wheat Lalmisri. Based on the values of Pelshenke, sedimentation and alveographic characteristics, the flours of 'Lalmisri' and 'UP 301' were found to be medium-strong gluten flours and the others weak gluten flours. In bread making characteristics such as loaf height, loaf wt. and loaf vol., 'Lalmisri' was found to be superior to the others. However, in terms of crust colour, crumb softness, taste and eating quality, the bread made from 'UP 301' had an edge over that made from 'Lalmisri' and 'Sonalika'. 'Thumri' and 'Dutee' were rated as poor quality wheats for bread making. AS

Wheat flour

1287

Hoseney (RC) and Rogers (DE). **The formation and properties of wheat flour doughs.** *CRC Critical Reviews in Food Science and Nutrition* 29(2): 1990: 73-93

Aspects reviewed in this article include: classes of wheat, milling of wheat to flour, relative comp. of wheat flours, wheat flour proteins, amino acid comp., formation of dough, overmixing of dough (effects of oxidants on mixing, effect of pH, and properties of over mixed dough), gas retention, loss of gas, dough rheology, rheology of fermenting dough (spread test and lubricating compression), heating of dough, effect of heat on gluten proteins, setting of baked products, effect of heat on starch, batters and cakes, mixing of cake batters and nonwheat doughs. SRA

1288

Guzman-Tello (R) and Cheftel (JC). **Colour loss during extrusion cooking of β-carotene-wheat flour mixes as an indicator of the intensity of thermal and oxidative processing.** *International Journal of Food Science and Technology* 25(4): 1990: 420-434

The thermal and/or oxidative colour loss from a wheat flour/all-trans β-carotene (20 - 80 mg kg^{-1}) mix during extrusion cooking follows first order kinetics. The intensity of processing in extrusion is reflected in the overall rate constant (K) of colour loss. K-values were in the range 3-20 x $10^{-3}s^{-1}$. They increased markedly with decreasing water content of the mix (24 - 14%), and with increasing barrel temp. (100 - 220 C). Results were independent of the type of twin-screw extruder (Werner-Pfleiderer Continua 37 or Clextral BC-45). Modelling of the overall rate constant K and of the 'equivalent plug flow' residence time was used to define 'iso-destructive' extrusion conditions giving approx. the same residence time and the same mean product temp. Extrusion under nitrogen or oxygen, or in the presence of 1 mg BHT/g of β-carotene, slightly affected colour loss. Adsorption chromatography on alumina indicated that within a barrel temp. range of 125 - 200 C, 38 - 73% of the initial all-trans β-carotene was destroyed, and that 2/3 to 1/2 of this loss corresponded to the formation of 9-cis plus 13-cis β-carotene isomers. The formation of smaller amounts of unknown β-carotene derivatives may be responsible for the colour loss. AS

Wheat proteins

Glutens

1289

Neufeld (KJ) and Walker (CE). **Evaluation of commercial wheat gluten using the mixograph.** *Cereal Foods World* 35(7): 1990: 667-669

MILLETS

Corn

1290

Tolaba (MP) and Suarez (C). **Desorption isotherms of shelled maize: Whole, dehulled and hulls.** *International Journal of Food Science and Technology* 25(4): 1990: 435-441

Water vapour desorption isotherms of whole kernel maize were determined at 40, 50 and 60 C, and those of dehulled kernels and hulls at 50 and 60 C. It was found that while whole and dehulled kernels show similar equilibrium moisture contents, the hull gives lower values. Equilibrium data were modelled with two-parameter equations. It was found that the

Henderson equation is best for describing the equilibrium data for whole kernels, while the Halsey equation was more appropriate for hulls. A simple semi-theoretical equation was used to model the effect of temp. on the equilibrium values of whole maize kernels for the 3 temp. investigated. BET heats of desorption and the isosteric heat curves were calculated for whole kernels and hull. It was found that the BET heat values correlate quite well with isosteric heat values at the monolayer moisture content. AS

1291

Lebron (CI), Molins (RA), Walker (HW), Kraft (AA) and Stahr (HM). **Inhibition of mold growth and mycotoxin production in high-moisture corn treated with phosphate.** *Journal of Food Protection* 52(5): 1989: 329-336

Corn starch

1292

Gehlawat (R) and Gehlawat (JK). **Small-scale production of starch from damaged grains.** *Research and Industry, India* 35(4): 1990: 214-218

Maize starch is produced traditionally in large-scale plants. An energy efficient low-cost technology has been developed to produce starch from grains at small-scale level. The process involves steeping grains in hot water (55 - 58 C), degermination by partial grinding, separation of germs, fine grinding of the slurry, removing the fibrous material, separating protein from starch by tabling method and drying of the starch. The paper describes results obtained at an experimental starch plant. Solar energy is used for heating water to be used for steeping grains as also for drying of byproducts. The capital investment for a 5 t/day capacity plant is Rs. 5 million. This is a viable process and setting up small-scale units close to the major consuming centre as well as raw material sources should prove economically highly attractive. KAR

Sorghum

1293

Aniche (GN). **Studies on the effects of germination and drying conditions on the cyanide content of sorghum sprouts.** *Journal of Food Science and Technology (India)* 27(4): 1990: 202-204

The effect of germination and drying on the cyanide content of sorghum sprouts were investigated by germinating sorghum of local red var. (LRV) at temp. of 25 and 30 C for 6 days and drying them at 55 C for 24 h. The toxic hydrogen cyanide content of the sorghum sprouts increased linearly as the number of days of germination increased. The highest amount of hydrogen cyanide was got from sorghum sprouts germinated at 30 C for 3 days. From the 4th day, the cyanide content started to decrease giving the least value on the 6th day of germination. Hydrogen cyanide in sorghum sprouts germinated at 25 C increased linearly with germination time, the highest value was got on the 6th day of germination. The cyanide content of the sorghum samples decreased as the drying time increased, giving the least value after 24 h drying. Germinating at 30 C produced higher amount of hydrogen cyanide in sorghum sprouts than germinating at 25 C. AS

PULSES

1294

Alvina (M), Vera (G) and Araya (H). **Legume consumption in preschool children: Effect of energy density and type of preparation.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 129-140 (Es)

1295

Bernal-Lugo (I), Prado (G), Parra (C), Moreno (E), Ramirez (J) and Velazco (O). **Phytic acid hydrolysis and bean susceptibility to storage induced hardening.** *Journal of Food Biochemistry* 14(4): 1990: 253-261

Two bean cv were stored over a 33-day period (75% RH and 41 C). After this period, cooked hardness, levels of phytate, phytase activity and integrity of protein bodies were minitored. The Michigan cv, which was the most susceptible to hardening, showed higher initial content of phytate which decreased by 20.7% after 30 days of storage. In contrast, Ojo de cabra, the cv less susceptible to hardening, presented lower initial content of phytate and a marked drop of 66.1% in its level during the same period of time. The phytase activity and the autolytic protein body destruction were higher in the last one than those in the former one. These results suggest that the contents of phytate or its rate of hydrolysis are not the major contributor to the seed susceptibility to storage induced hardening of different bean var. AS

Black gram

1296

Molly Thomas, Leelamma (S) and Kurup (PA). **Effect of black gram fibre (*Phaselous mungo*) on the metabolism of lipoproteins in rats.** *Journal of Food Science and Technology (India)* 27(4): 1990: 224-227

The effect of blackgram fibre on the metabolism of lipoproteins was studied in rats fed cholesterol-free diet for one month. Rats fed neutral detergent fibre (NDF) from blackgram showed lower concn. of cholesterol in VLDL and LDL fractions when compared to those fed isocaloric, fibre-free diet. Both the concn. of total protein and apo.B in VLDL and LDL showed a small increase in the NDF diet group. Plasma LCAT activity, activity of lipoprotein lipase in the heart and adipose tissue and post heparin lipolytic activity were also more in the rats of the NDF diet group. AS

Cowpeas

1297
Uzogara (SG), Morton (ID) and Daniel (JW). **Influence of various salts in the cooking water on pectin losses and cooked texture of cowpeas (*Vigna unguiculata*).** *Journal of Food Biochemistry* 14(4): 1990: 283-291

The effects of processing with solutions of calcium chloride, magnesium chloride, sodium bicarbonate and a local tenderizer known as 'Kanwa' (sodium sesquicarbonate) on pectin losses and cooked texture of cowpea seeds were investigated. For comparison, the cowpeas were processed in double distilled water and a local tap water. Analysis included total pectin, Ca and Mg content, leached solids, texture and water absorption. The results show that calcium chloride, magnesium chloride and the local tap water increased firmness, Ca and Mg content in the cooked beans compared to distilled water; however, water absorption, leached solids and pectin solubilization were decreased by these salts. 'Kanwa' and sodium bicarbonate increased water absorption, leached solids and softness in the cooked beans and also increased pectin solubilization but decreased Ca and Mg when compared to distilled water or the other salts. These changes are discussed with respect to the effects of divalent and monovalent cations on the texture of the bean tissue. AS

Locust beans

1298
Oyewole (OB) and Odunfa (SA). **Effect of cooking method on water absorption and ease of dehulling in preparation of African locust beans for Iru.** *International Journal of Food Science and Technology* 25(4): 1990: 461-463

Mung beans

1299
Singhakul (E) and Jindal (VK). **Small-scale processing of mungbean vermicelli.** *ASEAN Food Journal* 5(2): 1990: 84-86

Equipment and processing conditions for production of good quality vermicelli, is described in this paper. The equipments used for the vermicelli processing are grinder (emery stones of 20 cm dia. and operated at 720 r.p.m), separator (7 cm dia. and 16 cm long), batch mixer (Z-shape blade and 43 cm long and 126 r.p.m), extruder, stove and dryer. The various steps in processing of mungbean vermicelli has been adopted from the industrial scale processing to suit a village-level operation. The steps are flour preparation (mungbean cleaning, soaking, grinding, separation of slurry and coarse material, sedimentation and drying of flour) and vermicelli preparation (mixing, extruding and soaking, drying and packaging). BV

1300
Park (CE) and Sanders (GW). **Source of *Klebsiella pneumoniae* in alfalfa and mung bean sprouts and attempts to reduce its occurrence.** *Canadian Institute of Food Science and Technology Journal* 23(4/5): 1990: 189-192

Peas

Pea protein

1301
Anon. **Three ingredients in a pod.** *Food* 11(1): 1989: 43-45

A new range of functional ingredients (pea protein, pea fibre, pea starch) from pea have been developed by isolating the different components of the raw materials by a production method based on water extraction. The isolated pea protein has no low mol. wt proteins and carbohydrates. It acts as an efficient emulsifier on the same level as caseinate in processed meat products and is a good alternative to milk proteins. The dietary fibre has a neutral colour and taste and very easy to incorporate into existing food products. The fibre might be used as a fat replacer in processed meat products where a stable, low calorie product is needed. The pea starch can be a new alternative to existing starch ingredients already on the market such as meat products and confectionery. BV

Pigeon peas

1302
Liew (CCV) and Buckle (KA). **Oligosaccharide levels in pigeonpea and pigeonpea tempe.** *ASEAN Food Journal* 5(2): 1990: 79-81

The effects of processing and mould fermentation on the level of oligosaccharides in pigeonpea (*Cajanus cajan* L.) tempe and pigeonpea/soybean tempe are studied. The concn. of sucrose and the oligosaccharides are: intact seeds, sucrose 19 plus or minus 0.3, raffinose 2.0 plus or minus 0.2, stachyose 2.8 plus or minus 0.4, and verbascose 3.5 plus or minus 0.4; dehulled and soaked seeds, sucrose 1.7 plus or minus 0.4, raffinose 1.6 plus or minus 0.4, stachyose 1.7 plus or minus 0.3 and verbascose 1.5 plus or minus 0.1; pigeonpea tempe, sucrose 1.7 plus or minus 0.3, raffinose 1.5 plus or minus 0.5, stachyose 0.9 plus or minus 0.4, and verbascose 1.2 plus or minus 0.2 and pigeonpea\soybean tempe, sucrose 2.2 plus or minus 0.2, raffinose 1.0 plus or minus 0.4, stachyose 1.6 plus or minus 0.4 and verbascose 0.5 plus or minus 0.1. BV

Sweet lupins

1303

Vasquez (M), Knapp (E), Guzman (E) and Zacarias (I). **Sweet lupin (*Lupinus luteus* var. Aurea/Weico and *Lupinus albus* var. Multolupa) proteins. I.Extraction and filtration by Sephadex.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 150-158 (Es)

1304

Zacarias (I), Knapp (E), Guzman (E) and Vasquez (M). **Sweet lupin (*Lupinus luteus* var. Aurea/Weico and *Lupinus albus*, var. Multolupa) proteins. II.Their separation by electrophoresis.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 159-170 (Es)

1305

Camacho (L), Banados (E) and Fernandez (E). **Canning of 'humitas' prepared with opaque-2 corn, complemented with sweet lupin (*Lupinus luteus*, var. Aurea/Weico). Nutritional quality changes.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 185-199 (Es)

OILSEEDS AND NUTS

1306

Rao (MV). **Status of oil crops production potential and research priorities in India.** *Chemical Age of India* 40(11): 1990: 527-530

1307

Samant (SK) and Rege (DV). **Some enzymes and enzyme inhibitors from charoli and cashew nut.** *Journal of Food Science and Technology (India)* 27(4): 1990: 231-232

Charoli (*Buchanania lanzan*) and cashew nut (*Anacardium occidentale*) were analysed for enzymes and enzyme inhibitors. Both the seeds showed low amylase and urease activities. Charoli possessed active lipase while cashew nut exhibited low profile for both lipase and lipoxygenase. Both these seeds showed very low levels of amylase- and trypsin inhibitors. Roasting of the kernels reduced the enzyme activities drastically, however, the effect on inhibitors was not as severe as on enzymes. AS

Coconuts

1308

Jayalekshmy (A) and Mathew (AG). **Changes in the carbohydrates and proteins of coconut during roasting.** *Food Chemistry* 37(2): 1990: 123-134

Roasting markedly enhances the flavour of coconut due to the formation of volatile aroma compounds like pyrazines, which are generally formed during Maillard reaction between amino acids and reducing sugars. In coconut, these changes (not followed hitherto) are reported for the first time. Fructose and glucose are the most affected sugars, whereas lysine, tryptophan, glutamic acid, aspartic acid, alanine and glycine are the free amino acids maximally utilised during heating. AS

Hazelnuts

1309

Villarroel (M), Biolley (H), Schneeberger (RK), Ballester (DC) and Santibanez (SR). **Chemical composition and biological quality of defatted hazelnut flour.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 200-211 (Es)

Rapeseeds

1310

Schnug (E) and Haneklaus (S). **A systematical study on factors influencing the determination of the total glucosinolate content in rapeseed by the X-RF method.** *FAT Science Technology* 92(3): 1990: 101-106

Soybeans

1311

Jain (NN). **The role of soybean in Indian economy.** *Chemical Age of India* 40(11): 1990: 535-536

1312
Singh (J) and Sinha (LK). **A low-cost manual dehuller for soybeans.** *International Journal of Food Science and Technology* 25(4): 1990: 458-460

A low-cost manual dehuller has been developed for use by unskilled people in rural areas without electricity. Using 2 labourers, its capacity is 35 kg h^{-1} at 96% dehulling efficiency, at a cost of Rs 0.13 kg^{-1}. At a capital cost of Rs 2000, it would be an affordable communal item with potential to improve soybean utilization and nutrition in villages. AS

Soy products

1313
Chakrabarti (SR) and Gangopadhyay (SK). **Innovation of technology for preparation of rasogolla analogue from soy milk.** *Journal of Food Science and Technology (India)* 27(4): 1990: 242-243

Soy-rasogolla was successfully prepared from soy-chhana using 2% calcium lactate as coagulant at 85 C for coagulation which resembled the market *karapak* rasogolla made from milk. Use of rose flavour could considerably overcome the beany flavour of soybean. AS

TUBERS AND VEGETABLES

Cassava

1314
Visvanathan (R), Sreenarayanan (VV) and Gothandapani (L). **Energy requirement in mechanical chipping of tapioca.** *Journal of Food Science and Technology (India)* 27(4): 1990: 191-194

Chipping or slicing of tapioca with rotating knives was simulated by dropping a pendulum arm with knives of various sharpness at different cutting velocities. Cutting energy was determined at different velocities, bevel angles of knife and shear angles of cut in the pendulum. The cutting energy per unit cross-sectional area of the tuber decreased with increase in shear angle and bevel angle for all cutting velocities upto 60 to 75 degree and 30 to 45 degree resp. The min. cutting energy per unit cross-sectional area of 3.10 kg, cm/cm^2 was found at 2.68 m/sec, 63 and 37.5 degree of cutting velocity, shear angle and knife bevel angle resp. AS

Potatoes

1315
Slanina (P). **Solanine (glycoalkaloids) in potatoes.Toxicological evaluation.** *Food and Chemical Toxicology* 28(11): 1990: 759-761

Vegetables

1316
Soto (T), Meneses (A) and De Lecea (JR). **Influence of unfreezing temperature in the determination of the microbiological quality of frozen vegetables.** *Anales de Bromatologia* 41(2): 1989: 233-240 (Es)

Cucumbers

1317
Cabrera (RM) and Saltveit (MEJr). **Physiological response to chilling temperatures of intermittently warmed cucumber fruit.** *Journal of the American Society for Horticultural Science* 115(2): 1990: 256-261

Symptoms of chilling injury were reduced by intermittently warming cucumber fruit (*Cucumis sativus* L. cv. Poinsett 76) from 2.5 to 12.5 C for 18 hr every 3 days. Fruit continuously held at 2.5 C for 13 days developed severe pitting and decay after 6 days at 20 C, while fruit continuously held at 12.5 C or intermittently warmed showed no pitting or decay during subsequent holding at 20 C. The increased rate of C_2H_4 production during the first warming period, from 12 $nl.(kg.hr)^{-1}$ at 2.5 C to 201 $nl.(kg.hr)^{-1}$ at 12.5 C, was significantly greater than that during the second or third warming periods, i. e., 53 - 98 and 53 - 55 nl $C_2H_2/(kg.hr)$, resp. Respiration increased 3-fold during the initial warming period, but only 2-fold during subsequent warming periods. Leakage of cellular ions from excised disks of mesocarp tissue was around 6% and 10% of the total ion content of the tissue for control and intermittently warmed fruit, resp., but increased to 17% for fruit that were continuously held at 2.5 C for 10 days . After 320 h (3 cycles) of chilling and warming, chilled fruit showed significantly lower ethylene-forming enzyme activity than the control or intermittently warmed fruit. Fruit held at 12.5 C contained 0.09 to 0.34 $nmol.g^{-1}$ of 1-aminocyclopropane-1-carboxylic acid (ACC). ACC levels were 6.23 $nmol.g^{-1}$ in fruit exposed to 2.5 C for 320 h. In contrast, intermittently warmed fruit only showed 30% and 27% increases in ACC content during the first and second warming periods, resp. Periodic warming appears to allow chilled fruit to acclimate to subsequent periods of chilling. AS

Okra

1318

Baxter (L) and Waters (L). **Chemical changes in okra stored in air and controlled atmosphere.** *Journal of the American Society for Horticultural Science* 115(3): 1990: 452-454

Okra (*Abelmoschus esculentus* L. Moench) pods stored in a controlled atm. (CA) of 5% oxygen and 10% carbon dioxide at 11 plus or minus 1 C and in air at the same temp. (RA) were compared to determine the effects of the 2 storage environments on changes in sugars, organic acids, proteins and amino acids, and ascorbic acid contents within the tissue. Pods were sampled at 3-day intervals for 12 days. CA-stored pods generally had greater retention of sugars, soluble proteins, and amino acids than RA-stored pods. Citric, malic and ascorbic acids contents of CA pods also declined more slowly than those of RA pods. AS

Plantain

1319

Omuaru (VOT), Izonfuo (W-AL) and Braide (SA). **Enzymic browning in ripening plantain pulp (*Musa paradisiaca*) as related to endogenous factors.** *Journal of Food Science and Technology (India)* 27(4): 1990: 239-241

Ascorbic acid, total phenolic content and polyphenoloxidase (PPO) activity were determined in the pulp of a Nigerian cv of plantain, at 5 stages of ripening and correlated with browning tendency. The dark green (unripe) pulp had relatively low PPO activity and concn., low total phenolic content but high ascorbic acid level and exhibited the least browning potential. The increased browning potential observed with ripening has been related with relatively high PPO activity and level, low ascorbic acid content and high total phenolics. AS

Tomatoes

1320

Mohr (WP). **The influence of fruit anatomy on ease of peeling of tomatoes for canning.** *International Journal of Food Science and Technology* 25(4): 1990: 449-457

Anatomical features of the outer pericarp region of ripe tomato fruit were correlated with ease of peeling before canning. Fruit of many lines were examined, and were assessed for 11 properties that might be associated with the promotion of peel removal. Highest correlations were found for a steep cell-size gradient towards the outer surface, and also for an absence of small cells in the mesocarp. Several other features were significantly correlated with the ease of peel removal. AS

1321

Mohr (WP). **Tomato anatomy: Solids. Consistency relationships. Influence of fruit anatomy and solids composition of tomatoes on product consistency.** *Canadian Institute of Food Science and Technology Journal* 23(4/5): 1990: 193-197

Tomato paste

1322

Mallidis (CG), Frantzeskakis (P), Balatsouras (G) and Katsaboxakis (C). **Thermal treatment of aseptically processed tomato paste.** *International Journal of Food Science and Technology* 25(4): 1990: 442-448

The heat resistance characteristics of *Bacillus coagulans* (NRRL B-1103) spores suspended in buffer (pH 7.0, 4.5), tomato serum and tomato paste were studied. It was found that the heat resistance of spores was reduced significantly when buffer of pH 4.5, tomato serum or tomato paste was used as suspension medium instead of buffer pH 7.0. This effect was more apparent at higher temp. It was concluded that a thermal process of $F_{105\,C} = 3$ min is capable of causing at least 3D destruction of spores of the most heat resistant strains of *B. coagulans*. AS

FRUITS

1323

Wills (RBH). **Post-harvest technology of banana and papaya in ASEAN: an overview.** *ASEAN Food Journal* 5(2): 1990: 47-50

This article examines the post-harvest handling issues and investigates the techniques which have the potential to extend the market life of banana and papaya by delayed ripening, and undesirable physiological, biochemical and physical changes. Factors affecting ripening (maturity, temp. modified atm., pre-storage modified atm. irradiation, surface coating, Ca infiltration, controlled ripening, and ethylene) are discussed. BV

1324

Molnar-Perl (I) and Friedman (M). **Inhibition of browning by sulphur amino acids. 3. Apples and potatoes.** *Journal of Agricultural and Food Chemistry* 38(8): 1990: 1652-1656

Sodium sulphite, widely used to inhibit enzymatic and nonenzymatic browning in fruits and vegetables, has been reported to be an irritant to some consumers. In an effort to develop sulphite alternatives, 'Russet Burbank' potatoes, 'Washington Golden Delicious' apples, and 'Washington Red Delicious' apples were subjected to enzymatic browning in air and evacuated plastic pouches in the absence and presence of the following potential browning inhibitors:L-cysteine, N-acetyl-L-cysteine, reduced glutathione, sodium bisulphite, sodium sulphydrate, and sodium hydrosulphite. Studies on the effects of concn. of inhibitors, storage conditions, and pH revealed that N-acetyl-L-cysteine and reduced glutathione were nearly as effective as sodium sulphite in preventing browning of both apples and potatoes. In contrast, a previously proposed mixed solution of salicylic and ascorbic acids and potassium sorbate was effective only for short periods. N-acetyl-L-cysteine and reduced glutathione are promising alternatives to sulphite in preventing browning in fruits and vegetables. AS

Apples

1325

Soto-Valdez (H) and Trejo-Gonzalez (A). **Isolation and partial characterization of polyphenoloxidase from apple *Malus domestica* anna var.).** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 171-184 (Es)

1326

Contreas Lopez (A), Llaneza Coalla (HM), Corona De La Torre (J) and Santamaria Diez (P). **Extraction of pectin from apple waste produced in cider manufacture.** *Research and Industry, India* 35(4): 1990: 207-211

Pectin was extracted from apple waste obtained in the manufacture of apple pomace cider. The process was carried out in a batch reactor in a nitric acid medium. Factors affecting the rate of extraction of pectin were also studied to obtain optimum conditions for max. yield and greater quality of the extracted pectin. In this study the optimum parameters were found to be: stirring speed, 450 r.p.m., pH 1.5, temp. 85 C, pomace-acidulated water ratio 1:20 and particle size 2-3 mm. The pectin solubilisation reaction followed pseudo-first order kinetics. Kinetic constants for different extraction temp. were also obtained. AS

1327

Klein (JD) and Lurie (S). **Prestorage heat treatment as a means of improving poststorage quality of apples.** *Journal of the American Society for Horticultural Science* 115(2): 1990: 265-269

The benefits conferred by a prestorage heat treatment on poststorage quality of apples (*Malus domestica* Borkh.) were measured on 'Anna', a non-storing early cv. and 'Granny Smith', a long-storing late cv. The major benefit was a decrease in rate of apple softening, both during 0 C storage and during simulated shelf-life at 20 C. Soluble solids concn. was not affected by heat treatment, but titratable acidity was reduced. Ethylene production after heat treatment and storage was similar to or higher than that of control apples, but respiration was lower. The optimum temp. and time combination for prestorage treatment of both cv was 4 days at 38 C. AS

Bananas

1328

Zain (SOS). **Thermophilic anaerobic fermentation of banana peel slurry: Volatile fatty acids production.** *ASEAN Food Journal* 5(3): 1990: 114-116

Citrus fruits

Lemons

1329

Cohen (E), Lurie (S), Shapiro (B), Ben-Yehoshua (S), Shalom (Y), Rosenberger (I). **Prolonged storage of lemons using individual seal-packaging.** *Journal of the American Society for Horticultural Science* 115(2): 1990: 251-255

'Eureka' lemons [*Citrus limon* (L.) Burm. f.] treated for commercial storage were held for 6 months at 13 C. One-half of the fruits were individually sealed in high-density polyethylene (HDPE) plastic film and half not sealed. The HDPE-sealed lemons showed little change in the water relations characteristics, while unsealed lemons lost wt. and decreased in water potential throughout the storage period. The maturity indices in the two treatments were generally similar during the first 3 months of storage, after which maturation of wrapped fruit was slower than that of the control. The overall marketable quality of the fruit was higher in HDPE-sealed lemons than in unsealed. From these results, it appears feasible to introduce seal packaging in packing lines where lemons will be placed in extended storage. AS

Durian

1330

Tongdee (SC), Suwanagul (A), Neamprem (S) and Bunruengsri (U). **Effect of surface coatings on weight loss and internal atmosphere of durian (*Durio zibethinus* Murray) fruit.** *ASEAN Food Journal* 5(3): 1990: 103-107

Waxing fresh durian reduced transpiration when fruit were stored at 22 C or 18 C. The wt. loss depended on wax type and dilutions used. Waxing restricted gas movement through the rind resulting in higher internal carbon dioxide, lower oxygen and lower C_2H_4 concn. compared to non-waxed control fruit. Respiration rate and C_2H_4 evolution decreased in waxed fruit. The sulphurous odour, characteristic of ripe durian, was reduced by waxing. In some cases, ripening was partially or completely inhibited. The use of FMC SF 7055 wax appeared to provide a more predictable gas exchange pattern and reduction in ripening rate. AS

1331

Mohamed (S). **Extending the shelf-life of fresh durian (*Durio zibethinus*).** *ASEAN Food Journal* 5(3): 1990: 117-119

Mangoes

1332

Medlicott (AP), N'Diaye (M) and Sigrist (JMM). **Harvest maturity and concentration and exposure time to acetylene influence initiation of ripening in mangoes.** *Journal of the American Society for Horticultural Science* 115(3): 1990: 426-430

Ripening was assessed by physical and chemical quality before and after treatment with varying concn. of acetylene for varying duration of time in h on different maturity stages of 'Tommy Atkins', 'Ruby' and 'Amelie' var. mangoes kept at 25 C. Ripening initiation depended upon concn. of acetylene, duration, stage of maturity of mango fruit. Methodology of application of different concn. of acetylene for different duration of time was presented. BAP

1333

Medlicott (AR) and Sigrist (JMM). **Ripening of mangoes following low-temperature storage.** *Journal of the American Society for Horticultural Science* 115(3): 1990: 430-434

Effects of low-temp. i.e., 8, 10 and 12 C upto 3 wks on the storage behaviour of 'Tommy Atkins', 'Amelie' and 'Klett' var. of mangoes at different stages of maturity were studied. Chilling injury (CI) as indicated by improper ripening was found at all stages of maturity stored at 8 C. Fruits of mid and late harvest maturity kept better at 10 C than at 12 C with no apparent signs of CI. Data on pulp rupture force of different maturity stages stored at different temp. for different periods in days are presented in tables. BAP

Watermelon

1334

Ismail Siddique (M), Ahmed (M), Awan (JA), Salim Ur Rehman and Ahmed (A). **Production of wax gourd candy by using high fructose syrup.** *Journal of Food Science and Technology (India)* 27(4): 1990: 205-208

This study was carried out to determine the effect of substitution of sucrose with high fructose syrup (HFS) on the chem. comp. and sensory qualities of wax gourd (*Benincasa hispida*) candy. Candy was prepared by using sucrose and HFS in the proportions of 100:0, 75:25, 50:50, 25:75 and 0:100 in syrups at 30, 45, 60 and 75 degree Brix. Chem. analyses of the samples revealed that total soluble solids, reducing sugars and non-reducing sugars increased, while pH and moisture decreased with increase in the concn. of the syrup (degree Brix). On the other hand, reducing sugars increased with increase in HFS at all the Brix levels. Protein and ascorbic acid were unaffected by levels of HFS in the syrup. Candy prepared with 25% replacement of sucrose with HFS at 75 degree Brix proved the best as far as overall sensory quality and storage life of the product were concerned. The least acceptable product was the one prepared with 100% household sugar. AS

CONFECTIONERY, STARCH AND SUGAR

Confectionery

1335

Jackson (EB). **Glucose syrups. A blue print for improved confectionery.** *Confectionery Production* 56(2): 1990: 148

The properties and application of high D. E. glucose syrups are briefly discussed. SYR

1336

Lees (R). **Quality control in the sugar confectionery industry.** *Confectionery Production* 56(6): 1990: 470-472, 476

The quality control of sugar confectionery products is briefly described. These include desirable objectives that must be achieved during the production, essential features when introducing new lines, comp. of a confection, analyses, sampling and quality checks. SYR

Chocolates

1337

Lees (R). **Milk products and chocolate crumb. Part. 1. Milk products.** *Confectionery Production* 56(10): 1990: 750-751

1338

Lees (R). **Milk products and chocolate crumb. Part. 2. Chocolate crumb.** *Confectionery Production* 56(11): 1990: 804, 814

Starch

1339

Rapaille (A). **Starch in microwave cookery.** *Food Trade Review* 60(6): 1990: 314, 319

BAKERY PRODUCTS

1340

Gelinas (P), Fiset (G), LeDuy (A) and Goulet (J). **Effect of growth conditions and trehalose content on cryotolerance of baker's yeast in frozen doughs.** *Applied and Environmental Microbiology* 55(10): 1989: 2453-2459

The cryotolerance in frozen doughs and in water suspensions of bakers' yeast (*Saccharomyces cerevisiae*) previously grown under various industrial conditions was evaluated on a lab. scale. Fed-batch cultures were very superior to batch cultures, and strong aeration enhanced cryoresistance in both cases for freezing rates of 1 to 56 C min^{-1}. Loss of cell viability in frozen dough or water was related to the duration of the dissolved-oxygen deficit during fed-batch growth. Strongly aerobic fed-batch cultures grown at a reduced av. specific rate (μ = 0.088 h^{-1} compared with 0.117 h^{-1}) also showed greater trehalose synthesis and improved frozen-dough stability. Insufficient aeration(dissolved-oxygen deficit) and lower growth temp. (20 C instead of 30 C) decreased both fed-batch-grown yeast cryoresistance and trehalose content. Although trehalose had a cryoprotective effect in *S. cerevisiae*, its effect was neutralized by even a momentary lack of excess dissolved oxygen in the fed-batch growth medium. AS

1341

Oda (Y) and Ouchi (K). **Effect of invertase activity on the leavening ability of yeast in sweet dough.** *Food Microbiology* 7(3): 1990: 241-248

Leavening ability of yeast in dough and invertase activity were determined in 32 strains of *Saccharomyces cerevisiae*. By the regression analysis of the data obtained, participation of invertase in sweet dough leavening was less than the osmotolerance of yeast cells. Four representative strains were selected and further investigation was conducted in these strains. Along with the concn. of NaCl added to the growth medium, sweet dough leavening increased but invertase activity changed independently. Acid treatment of the cells with diluted HCl deprived the yeast cells of invertase activity in the four strains, and elevated leavening ability was observed in sweet dough in the two strains but not in the other two strains. Addition of purified invertase to the dough gave a limited effect on the sweet dough leavening. These observations suggested that invertase activity was not obligately related to the leavening ability of sweet dough. AS

1342

Hebeda (RE), Bowles (LK) and Teague (WM). **Developments in enzymes for retarding staling of baked goods.** *Cereal Foods World* 35(5): 1990: 453-454, 456-457

This article discusses the staling mechanism, measurement of staling (instrumental methods and the squeezing method), enzymatic methods for reducing staling (cereal α-amylases, fungal α-amylases, bacterial α-amylases and intermediate stability amylases) and recent developments that account for the increased use of enzymes as anti-staling agents. BV

1343

Shogren (M). **A short history of the mixograph.** *Cereal Foods World* 35(5): 1990: 480-482

1344

Stearns (MM) and Barta (S). **Mixograph standardization/digital data acquisition.** *Cereal Foods World* 35(5): 1990: 485-486, 488

1345

Navickis (LL), Rubenthaler (GS), Nelsen (TC) and Butterfield (RO). **Evaluating mixogram parameters by electronic torque sensing.** *Cereal Foods World* 35(5): 1990: 493-496

1346

Rajor (RB), Thompkinson (DK) and Rao (BR). **Protein enrichment of biscuits and cookies.** *Indian Journal of Dairy Science* 42(3): 1989; 645-649

The use of milk proteins, vegetable proteins, fish proteins, effect of baking on nutritive value of biscuits and packaging and keeping quality of biscuits, are covered in this article SRA

Bread

1347

Walsh (DE) and Walker (CE). **Bakery construction design.** *Cereal Foods World* 35(5): 1990; 446, 448-450

This paper deals with the construction design fundamental that should be of interest to anyone that has been or might be involved in designing or remodeling a commercial bread bakery. Sanitation, productivity, equipments, site selection, building exterior and interior, and ventilation and dust control are the aspects covered. BV

1348

Czuchajowska (Z) and Pomeranz (Y). **Quest for a universal test of commercial gluten quality for breadmaking.** *Cereal Foods World* 35(5): 1990; 458, 460, 463-464, 466, 468-469

This feature article covers several methods for evaluation of commercial wheat gluten. The authors suggests the need for standardizing a method for testing the quality of commercial gluten. PHR

Pasta

Vermicelli

1349

Siwawej (S). **Vermicelli from sorghum and soya.** *Food Australia* 42(5): 1990; 224-225

Production of sorghum and soy flour based vermicelli rich in protein is presented. The nutritional value of sorghum-based vermicelli increased substantially by inclusion of soy flour (10, 20 and 30% level) without affecting the flavour and texture of the products. The colour darkens to a creamy tint with rise in soy content. Higher levels of soy flour improved rehydration capacity but decreased the strength of the pasta products. BV

1350

Young (GS) and Jolly (PG). **Microwaves: The potential for use in dairy processing.** *Australian Journal of Dairy Technology* 45(1): 1990; 34-37

Potential applications of microwave processing in the field of dairy processing have been discussed. Advantages and disadvantages of the process are listed. JSS

1351

Paul (SC) and Mathur (BN). **Standardization of processing parameters for enzymic hydrolysis of lactose on pilot scale.** *Indian Journal of Dairy Science* 42(3): 1989; 643-644

1352

Thompkinson (DK) and Mathur (BN). **Co-relation of chemical parameters for measurement of oxidation in pufa rich dried food system.** *Indian Journal of Dairy Science* 42(3): 1989; 659-660

Milk

1353

Kocak (HR) and Zadow (JG). **The effect of lactose hydrolysis and subsequent low-temperature-inactivation treatment of age gelation of UHT whole milk.** *Australian Journal of Dairy Technology* 44(1): 1989; 37-40

Studies on the stability and selected properties of stored lactose-hydrolysed UHT whole milk are presented and the effect of low-temp.-inactivation (LTI) treatment is also examined. Lactose hydrolysis has little effect on the apparent viscosity of UHT milk, nor does it affect the time of onset of age gelation. Changes in pH and reflectance during storage of control and lactose-hydrolysed UHT milks are similar. LTI prior to UHT processing of lactose-hydrolysed milks did not result in a useful extension of shelf-life. LTI after UHT processing of lactose hydrolysed milk resulted in an approximate doubling of the shelf-life of the product. SRA

1354

Cromie (SJ), Schmidt (D) and Dommett (TW). **Effect of pasteurization and storage conditions on the microbiological, chemical and physical quality of aseptically packaged milk.** *Australian Journal of Dairy Technology* 44(1): 1989; 25-30

This paper describes the microbiological, chemical and physical quality of especially packed milks

pasteurized under different temp., time regimes varying from 72 C/15 seconds to 88 C/15 seconds and then stored at 3 C or 7 C. The storage temp. of milk after pasteurization and aseptic packaging affected the bacterial growth more rapidly at 7 C than at 3 C. Pasteurization treatment effects on the microflora were evident only in milk stored at 3 C after pasteurization. During storage, a rapid increase in the standard plate counts, psychrotrop and anaerobic counts in milks heated to 80 C or higher was noticed. Free fatty acid levels increased during storage at 3 C and 7 C in milks pasteurized at temp. of 80 C or lower. SRA

1355

Schmidt (D), Cromie (SJ) and Dommett (TW). **Effect of pasteurization and storage conditions on the shelf-life and sensory quality of aseptically packaged milk.** *Australian Journal of Dairy Technology* 44(1): 1989: 19-24

This study examines the effect of different pasteurization and storage conditions on the shelf-life of aseptically packed liquid milk. 15 pasteurization treatments ranging from 72 C/15 seconds to 88 C/15 seconds were examined. The pasteurized milks were stored at either 3 C or 7 C until serious flavour defects occurred. In storage they were graded for quality of flavour, texture and appearance. Milk stored at 3 C had 21 days more shelf-life than milk stored at 7 C. Pasteurization affected the shelf-life to lesser extent, and became less important as the storage temp. increased. The shelf-life of pasteurized, homogenised milk was not improved by increasing the severity of pasteurization conditions above 72 C/15 seconds. The flavour quality of milk was impaired by the use of high pasteurization conditions. Texture and appearance were not affected to the same extent. SRA

1356

Cromie (SJ) and Dommett (TW). **Relationships between bacterial counts and acceptability of refrigerated pasteurized milk.** *Australian Journal of Dairy Technology* 44(1): 1989: 4-6

The purpose of this study was to examine whether a range of microbiological counts, free fatty acid (FFA) concn. and pH could be useful indicators of the acceptability of pasteurized milk. Pasteurized milks were stored at 4 C and 7 C upto 21 days. Samples were subjected to sensory evaluation, microbiological and chem. analysis. Correlation coeff. were calculated. The parameters that gave the highest correlations with the flavour acceptability score were standard plate count (r = -0.70) for milk stored at 7 C and gram negative count (r = - 0.58) for milk stored at 4 C. These results show poor relationships between microbial counts and flavour acceptability of pasteurized milks. The study also showed that neither free fatty acid concn. nor pH correlated with flavour acceptability. SRA

1357

Molska (I), Zmarlicki (S), Konarzewska (G) and Janicki (A). **Effect of heat treatment on microbiological and keeping quality of milk stored at 4 plus or minus 2 C.** *Acta Alimentaria Polonica* 15(1): 1989: 25-34

1358

Mittal (SB), Hourigan (JA) and Zadow (JG). **Effect of added sodium hexametaphosphate on certain technological aspects of UHT recombined milk.** *Australian Journal of Dairy Technology* 45(1): 1990: 1-4

1359

Singh (H) and Tokley (RP). **Effects of preheat treatments and buttermilk addition on the seasonal variations in the heat stability of recombined evaporated milk and reconstituted concentrated milk.** *Australian Journal of Dairy Technology* 45(1): 1990: 10-16

1360

Brown (CA), Davey (JA) and Hughes (D). **Evaluation of a micropipette and the autoloop for bacteriological counts on raw milk.** *Australian Journal of Dairy Technology* 45(1): 1990: 17-20

1361

Williams (DJ) and Nottingham (SM). **Suitability of a modification to the Aschaffenburg and Mullen alkaline phosphatase test for goat's milk. Collaborative study.** *Australian Journal of Dairy Technology* 45(1): 1990: 21-23

1362

Giles (JE), Mitchell (GE) and Thomson (RS). **Precision in determination of bulk milk chemical composition with random sampling.** *Australian Journal of Dairy Technology* 45(1): 1990: 24-26

1363

Shrestha (KG) and Sinha (RN). **A rapid method for the detection of coliforms in processed milk and milk products.** *Australian Journal of Dairy Technology* 45(1): 1990: 27-30

The present study was undertaken to evaluate a simple test for the rapid detection of coliforms in flavoured milk, ice-cream and skim milk powder. In the test, a conc. of the product obtained by centrifugation, is mixed with an equal quantity of

double-strength broth before incubation at 37 C. 101 samples were examined for Most Probable Number (MPN) of coliforms by presumptive coliform test at 37 C and checked for the earliest time required to detect the coliforms by the rapid test. Coliform levels at 1 - 10/mL could be detected in 8.33 - 10.37 h while higher counts, 11 - 100/mL and 101 - 1000/mL, could be detected in 7.67 h and 5.83 h resp. MacConkey, BGLB and VRB broths gave comparable results. The MPN of coliforms and the rapid detection time were significantly and highly negatively correlated. On inoculation with pure cultures of coliforms and non-coliforms, the rapid test proved to be specific for coliforms and did not exhibit either false-positive or false-negative reactions. Since the rapidtest does not require any additional equipment than what is normally present in the quality control lab., the test may be conveniently adopted in dairy plants for processed milk and milk products as well as for the line-testing programme. This rapid test is much cheaper than the conventional presumptive coliform test. AS

1364

Symons (MH) and Ewings (KN). **Monoclonal antibodies reactive to some *Pseudomonas fluorescens* proteases.** *Australian Journal of Dairy Technology* 45(1): 1990: 31-33

1365

Johl (SS). **Solving the edible oil crisis in India by massive production of milk fat.** *Indian Dairyman* 43(4): 1991: 163-177

The author reviews the availability of edible oils in India over the last one decade, the fluctuation in prices of edible oils, converting the higher quality of raw edible oil to lowering quality of vanaspathi, the limited possibilities for extending the area and the production of oilseed crops in India, and the scope for production of butter oil along with their cost estimate for overcoming the oil shortage in the country. KAR

1366

Wadhwa (BK) and Jain (MK). **Lactones in milk and milk products. Part I. Isolation, characterisation and estimation methods - A review.** *Indian Journal of Dairy Science* 42(3): 1989: 511-517

Review. 84 references. SRA

1367

Wadhwa (BK) and Jain (MK). **Lactones in milk and milk products. Part II. Factors affecting lactone potential - A review.** *Indian Journal of Dairy Science* 42(3): 1989: 518-522

Review. 41 references. SRA

1368

Neelam Gupta and Mathur (MP). **Some properties of ribonuclease from buffalo and goat milk.** *Indian Journal of Dairy Science* 42(3): 1989: 572-578

1369

Joginder Singh and Srinivasan (MR). **Hydrogen sulphide contents during manufacture of buffalo sterilized milk.** *Indian Journal of Dairy Science* 42(3): 1989: 640-642

Hydrogen sulphide content of milk was max. on preheating at 100 C/flash. Thereafter it decreased with increase in heat treatment, with min. values after max. heat treatment during sterilisation. The hydrogen sulphide content in buffalo milk was consistently higher than that of cow milk for all treatments. SRA

1370

Sankara Reddy (I), Reddy (RRRK), Jairam (BT) and Venkayya (D). **Bacteriological quality of cow milk.** *Indian Journal of Dairy Science* 42(3): 1989: 650-652

1371

Bashir Ahmed, Mital (BK) and Garg (SK). **Effect of magnesium and manganese ions on the growth of *Lactobacillus acidophilus*.** *Journal of Food Science and Technology (India)* 27(4): 1990: 228-229

All the tested strains of *Lactobacillus acidophilus* exhibited higher viable counts, greater acid production and shorter generation time when milk was supplemented with 19.72 Mg^{++}/l or 11.39 mg Mn^{++}/l as compared to the control. Supplementation of milk with both Mg and Mn had no appreciable effect on these attributes compared to that observed for each individually. AS

1372

Allen (G), Satchell (FB), Andrews (WH) and Bruce (VR). **'Abbreviated selective enrichment, post enrichment and rapid immunodiffusion method for recovery of *Salmonella* from instant nonfat dry milk.** *Journal of Food Protection* 52(5): 1989: 350-355

Milk products

1373

Umoh (VJ), Adesiyn (AA) and Gomwalk (NE). **Seasonal variation, characteristics and enterotoxin production by staphylococcal isolates from fermented milk products.** *Food Microbiology* 7(3): 1990: 167-175

1374

Patel (JR), Dave (RI), Sannabadti (SS) and Dave (JM). **Use of bifidobacteria in fermented dairy products.** *Indian Dairyman* 43(4): 1991: 181-185

Use of bifidobacteria in the preparation of fermented milk products, their characteristics like acidity, flavour and aroma, ropiness and consistency, proteolysis, antibacterial nature, antibiotic resistance and some baby foods containing bifidobacteria are given. KAR

1375

Vijay Kumar and Sinha (RN). **Incidence of coliforms in indigenous milk products.** *Indian Journal of Dairy Science* 42(3): 1989: 579-580

Results indicated the presence of 'total' and 'faecal' coliforms varying between 0 and 120/g even though the product was sweetened in all the samples except one. In case of paneer 86% and in khoa 82% of faecal coliform isolates were confirmed as *Escherichia coli*. More than 60% of the samples were found to have unsatisfactory level of both 'total' and 'faecal' coliforms. SRA

1376

Verma (RD) and Girdhari Lal. **Energy analysis in Indian dairy products processing.** *Indian Journal of Dairy Science* 42(3): 1989: 608-610

The trails for converting milk to khoa, paneer and cream, and butter to ghee are carried out. The data obtained have been used for estimating thermal energy loss by convection and radiation, losses from product surface and losses with condensate. The results have shown that total thermal energy loss estimated to be 32.03%, 52.18% and 18.5% for khoa, ghee and paneer resp. The thermal energy losses due to convection, radiation and with condensate are 3.20% and 14.3% for khoa, 12.35% and 17.8% for ghee, 3.52% and 10.5% for paneer. The average percentage energy saved by reutilizing the condensate have been found to be 8.32% and 11.95% for khoa and ghee resp. This method would prove to be very effective to reduce energy utilisation in processing of Indian dairy products. SRA

1377

Khedekar (CD), Dave (JM) and Sannabhadti (SS). **Inhibition of growth and pathogenic microorganisms during production and storage of cultured milk.** *Journal of Food Science and Technology (India)* 27(4): 1990: 214-217

Lactobacillus acidophilus strains $LBKV_3$ and $LBKI_4$ were inoculated in sterilised skim milk along with enterotoxigenic *Staphylococcus aureus* in one set while the other set was inoculated with mastitic *Escherichia coli*. Many lactic cultures have been reported to be antagonistic to pathogenic bacteria, so a comparison was made of the acidophilus cultures with mixed strain lactic cultures, LF-40 and yoghurt cultures (*Lactobacillus bulgaricus*-LBW and *Streptococcus thermophilus*-CH_1. Staphylococcal and coliform counts were estimated along with titratable acidities, at selected time intervals upto 72 h during production and storage at 37 C and subsequent storage at 15 C for 60 h. It was observed that both the *L. acidophilus* strains $LBKV_3$ and $LBKI_4$ were able to restrict growth of *Staph. aureus* only after 16 and 20 h. resp., while they reduced the growth of *E. coli* after 48 and 72 h at 37 C. However, when the samples were stored at 15 C there was no significant decrease in coliform counts throughout the storage periods, while it showed continuous lowering down of *Staph. aureus* count when it was associated with $LBKV_3$ and yoghurt starters. Inhibition of both the pathogenic organisms was more at 37 C than at 15 C. Rates of acid production of all four cultures were different at both the temp. studied. AS

Butter

1378

Maiti (P), Sarma (SC), Zaidi (AH) and Abichandani (H). **Study of churning parameters of continuous butter making machine through scale - down model.** *Indian Journal of Dairy Science* 42(3): 1989: 523-528

The effects of churning speed and fat level in cream on butter yield and quality were investigated. Keeping factors like acidity, ageing time, temp., and flow rate at constant values of 0.07 - 0.08 %, 10 h, 8 - 9 C and 1.15 kg/min resp. Twenty seven trials were conducted and observation were recorded. Significant effect on fat level of cream, churning speed and their interaction on overall quality of butter and fat loss in butter milk was observed. The results of this study conducted in a lab. model indicate that a fat level of 40% and churning speed of 1750 r.p.m. was found most suitable for obtaining good quality of butter with min. fat loss in butter milk. SRA

Cheese

1379

Vosniakos (F), Moumtzis (A), Kesidou (A), Ganatsios (S), Bizopoulos (A) and Karaoltsidis (P). **Transfer of ^{121}I and ^{137}Cs from cow milk to cheese and other products.** *Australian Journal of Dairy Technology* 44(1): 1989: 44-46

In this study the amounts of the radioactive isotopes ^{131}I and ^{137}C in curd, cheese, whey, mytzithra and lactose serum in conditions similar to those existing during the accident in Chernobyl is reported. The av. values recovered for ^{131}I in cheese curd and cheese-whey were 28.9% and 71.1% resp. The av. values for ^{137}Cs were 17.6% and 82.4%. In mytzithra production the amount of radioactivity transferred was 17.1% for ^{131}I and 21.1% for ^{137}Cs with the rest remaining in lactose serum. The results of the work demonstrate that these radioactive isotopes follow the water phase during processing of contaminated milk. As the contamination of milk increases the higher proportion of ^{137}Cs and ^{131}I is retained in the cheese curd. The radioactivity dosage used were upto 6000 Bq/kg. SRA

1380

Pluta (A), Zmarlicki (S), Olech (B), Budzynska (B) and Gawel (J). **The influence of nitrates addition to milk on chosen properties of cheese.** *Acta Alimentaria Polonica* 15(1): 1989: 35-44

1381

Olson (NF) and Johnson (ME). **Low-fat cheese technology.** *Food Engineering International* 15(10): 1990: 31-37

1382

Fox (PF), Lucey (JA) and Cogan (TM). **Glycolysis and related reactions during cheese manufacture and ripening.** *CRC Critical Reviews in Food Science and Nutrition* 29(4): 1990: 237-253

This review considers the acidification during cheese manufacture, significance of acid development in cheese, lactose metabolism by starter bacteria (sugar transport and metabolism:*Lactococcus*, *Leuconostocs*, *Streptococcus thermophilus*, thermophillic lactobacilli, mesophillic lactobacilli and pediococci), production of lactic acid in cheese curd and factors affecting it (preincubation of inoculated cheese-milk, cooking temp., phage, antibiotics and other inhibitors), retention of lactose in cheese curd (acid development, moisture content of the curd, the initial lactose content of cheese-milk, alteration of the lactose content of cheese curd, curd washing or addition of water, ultrafilteration and prehydrolysis of lactose), consequences of acid production (buffering capacity changes, structure and texture, curd syneresis, enzyme retention and activity, salt retention, metabolism of lactose, lactate, and citrate during ripening, citrate metabolism and effect of pH on cheese quality). 136 references. SRA

Cheddar cheese

1383

Mayes (JJ) and Sutherland (BJ). **Further notes on coagulum firmness and yield in Cheddar cheese manufacture.** *Australian Journal of Dairy Technology* 44(1): 1989: 47-48

1384

Barlow (I), Lloyd (GT), Ramshaw (EH), Miller (AJ), McCabe (GP) and McCabe (L). **Correlations and changes in flavour and chemical parameters of Cheddar cheeses during maturation.** *Australian Journal of Dairy Technology* 44(1): 1989: 7-18

1385

Rengpipat (S) and Johnson (EA). **Characterization of *Lactobacillus* strain producing white crystals on Cheddar cheese.** *Applied and Environmental Microbiology* 55(10): 1989: 2579-2582

1386

Abraham Vema and Anand (SR). **Biochemical changes associated with ripening of Cheddar cheese from buffalo milk: Ripening changes at elevated temperatures.** *Indian Journal of Dairy Science* 42(3): 1989: 581-583

1387

Abraham Vema and Anand (SR). **Biochemical changes associated with ripening of Cheddar cheese from buffalo milk: Effect of bacterial enzymes in accelerating the cheese ripening.** *Indian Journal of Dairy Science* 42(3): 1989: 584-588

Cottage cheese

1388

Rastogi (MK), Pandya (RN), Tewari (BD) and Singh (S). **Comparative evaluation of lactic cultures for cottage cheese making from cow and buffalo milk.** *Indian Journal of Dairy Science* 42(3): 1989: 561-564

Three mesophillic lactic cultures (BD1, LF-40 and CHg) were used in cow skim milk (CSM) and buffalo skim milk (BSM) for cottage cheese making. The total solid content of CSM and BSM was 8.8 and 10.0% resp. The rate of acidity level development was the fastest with BD1 culture in both BSM and CSM. The setting time and cutting acidity were less in BSM when compared to CSM. The moisture content of BSM cheese varied from 73.8 to 75.2% which was lower than the normal. In case of CSM cheese it varied from 78.0 to 78.5%. The lower moisture content in BSM could have been contributed to its body and textural defects. The sensory score of BSM cheese was less than that scored by CSM cheese. SRA

1389

Pandya (RN), Tewari (BD) and Singh (S). **Performance of yoghurt culture in cottage cheese.** *Indian Journal of Dairy Science* 42(3); 1989; 565-567

This study was conducted to explore the possibility of using yoghurt culture for cottage cheese making from cow skim milk (CSM) and buffalo skim milk (BSM) and to reduce the total manufacturing time of short set method. Utilization of yoghurt cultures for cottage cheese making by short set method reduced the setting time but affected the body and texture adversely. BSM based cottage cheese made with yoghurt culture was superior as compared to that of CSM.. Setting time and sensory score was reduced by increasing the rate of inoculum in cheese made from both type of milk. SRA

1390

Pandya (RN), Tewari (BD) and Singh (S). **Effect of processing variables on cottage cheese prepared from buffalo milk.** *Indian Journal of Dairy Science* 42(3); 1989; 568-571

The effect of parameters like the rate of inoculum, cutting acidity, addition of starch and salt and different cooking procedures on the quality of cottage cheese from buffalo milk are investigated. BD1 culture was used. Increasing the inoculum level from usual 5% used in short set method to 6% did not influence the setting time. It is observed that the cheese prepared from buffalo milk contained less moisture, lacked cream absorbing properties and was chewy at both the levels of inoculum. The single strain cultures gave higher yield while mixed strain cultures resulted in higher scores for sensory quality. Addition of 0.1% salt to milk, cutting the coagulum at 7.0% TA and cooking of curd at 60 C in 75 min. improved the product quality. SRA

Mozzarella cheese

1391

Shukla (DC) and Ladkani (BG). **Quality of direct acid Mozzarella cheese from buffalo milk.** *Indian Journal of Dairy Science* 42(3); 1989; 601-605

1392

Ghosh (BC) and Singh (S). **Effect of heat treatment on the quality of Mozzarella cheese from buffalo milk.** *Journal of Food Science and Technology (India)* 27(4); 1990; 218-220

Mozzarella cheese was made from raw, pasteurised (63 C/30 min) and high temp. heated (71 C/30 min) buffalo milk standardised to 4.0% fat. Cheeses prepared from raw and pasteurised milk were superior to those prepared from milk heated to high temp. The flavour characteristics of pasteurised milk cheese was superior to that of raw milk cheese whereas the body and texture characteristics were similar. The melting and stretching characteristics of cheese made from milk heated to high temp. were also inferior to the cheeses made from raw and pasteurised milks. The rheological characteristics of cheese made from milk heated to high temp. improved with the addition of 0.01% calcium chloride. AS

Teleme cheese

1393

Kalogridou-Vassiliadou (D). **Lactic acid production by teleme cheese starter in milk fortified with some fatty acids.** *Australian Journal of Dairy Technology* 44(1); 1989; 1-3

Ice cream

1394

Abu-Lehia (IH), Al-Mohizea (IS) and El-Behry (M). **Studies on the production of ice-cream from camel milk products.** *Australian Journal of Dairy Technology* 44(1); 1989; 31-34

Camel milk products, such as cream, milk powder and skim milk, were used to manufacture ice-cream. Different levels of fat (4.8 and 12%) and milk solids-not-fat (MSNF) (9.11 and 13%), were used in preparing the mixes. The viscosity of the ice-cream mixes were significantly increased (P less than or equal to 0.05) by increasing fat from 4 to 12% and MSNF from 9 to 13%. Ice cream overrun was significantly increased (P less than or equal to 0.05) by increasing fat from 4 to 12% and MSNF from 9 to 11%. Portions of ice-cream melted within 2 h were gradually decreased, but not significantly, by increasing fat alone from 4 to 12%. Melted portions of ice-cream were correlated negatively (r = -0.92) with the overrun of the ice-cream. Mixes made with 12% fat, 11% MSNF and 37% T.S. gave the highest scores for colour, flavour and texture, as well as the overall acceptability. AS

Khoa

1395

Ranganadham (M) and Rajorhia (GS). **Effect of processing conditions on free fat content in khoa.** *Indian Journal of Dairy Science* 42(3); 1989; 558-560

Free fat (FF) content in khoa increased with the increase in fat level irrespective of the kind of milk. FF content in buffalo milk based khoa was higher

than obtainable from cow milk at all fat levels. Homogenization of milk reduced the FF in khoa samples to about one-half. FF content increased with increased total solids in khoa. Addition of Tween-80, glycerol monostearate and sodium citrate separately at 0.1% by wt. of milk prior to khoa making reduced the FF in khoa by about 9 - 14%. AS

1396

Goyal (GK) and Srinivasan (MR). **Humidity-moisture sorption relationship of khoa.** *Indian Journal of Dairy Science* 42(3): 1989: 606-607

The sorption isotherms for 3 types of khoa samples (from cow's milk, buffalo's milk and market) were observed and this has shown that there is steep rise above 45% RH. The desorption occurred in all 3 var. of khoa under all RH ranging from 11 to 92%. The equilibrium moisture content of less than 17% in khoa of cow's milk, 12% in buffalo's milk, and 21% in market corresponding to about 54% RH were observed to be safe moisture content to avoid mould growth. But at these moisture levels the khoa was hard. From these observations it appears that no packaging material can help in checking the microbial deterioration of khoa. But the packaging materials which have sufficient water vapour barrier, oxygen barrier, and grease resistance properties may help in preservation of khoa. SRA

1397

Gupta (SK), Patil (GR), Patel (AA), Garg (FC) and Rajorhia (GS). **Instron texture profile parameters of khoa as influenced by composition.** *Journal of Food Science and Technology (India)* 27(4): 1990: 209-213

An increase in total solids (TS) was accompanied by a considerable increase in Instron hardness, gumminess and chewiness, but decrease in cohesiveness of khoa. Water dispersible protein (WDP) had the opposite effect although its effect on cohesiveness was non-significant. Milk acidity and free fat content of khoa did not show any significant correlations with texture profile (TP) parameters. However, their inclusion in regression analysis made a small but preceivable improvement in predictablity of cohesiveness and chewiness. Significant interrelationships among TP parameters, particularly between hardness and cohesiveness, gumminess and chewiness, and also between cohesiveness and all other parameters indicated that one or two most important TP parameters could probably serve as an index of the texture profile of khoa. Adhesiveness and springiness of khoa generally showed poor correlations with compositional characteristics as also with other TP parameters. AS

Milk powder

1398

Fichtali (J), Van De Voort (FR) and Toupin (CJ). **Coagulation and washing conditions for acid casein production from skim milk powder.** *International Journal of Food Science and Technology* 25(4): 1990: 377-388

Paneer

1399

Dharam Pal and Garg (FC). **Utilization of sour buttermilk in the manufacture of paneer.** *Indian Journal of Dairy Science* 42(3): 1989: 589-594

The effect of addition of sour buttermilk on the sensory quality, chem. comp., yield, recovery of solids, rheological properties and storage quality of paneer is investigated. Buffalo buttermilk was standardised to fat ratio of 1:1 by adding sour buttermilk and paneer (refered as buttermilk extended paneer (BEP)) was prepared and compared with control paneer (CP). Initial problems like self coagulation of milk during heating, development of acidic smell, sour taste and grainy texture were solved by neutralisation of sour buttermilk to about 0.15% acidity with sodium bicarbonate before use and washing curd with hot water at 72 C before pressing produced paneer at acceptable quality as controlled paneer. There was no appreciable difference in the sensory scores of BEP and CP. The moisture content and yield of BEP were higher than CP. The recovery of solids in BEP and its rheological properties were not at large variance from that of CP. Addition of sour buttermilk had no adverse effect on the keeping quality of paneer. SRA

Wheys

Whey powder

1400

Ozbas (T) and Kutsal (T). **Hydrolysis of lactose in whey powder solutions by *Aspergillus oryzae* lactase.** *Journal of Food Science and Technology (India)* 27(4): 1990: 195-197

In this study, the effects of pH and temp. on initial reaction rates and relative activities (%) for lactose hydrolysis in whey powder solutions by *Aspergillus oryzae* β-galactosidase were investigated. Optimum conditions were found as: pH = 4.5, T = 50 C and Michaelis-Menten Constant, Km = 52.78 nM lactose

and max. reaction rate, v_m = 1.25 nmole glucose l^{-1} min^{-1} for soluble lactase. AS

Whey proteins

1401
Dziuba (J) and Bochenek (A). **Mechanism of proteolysis and coagulation of milk fortified with alcohol-precipitated whey proteins. Part I. Proteolysis.** *Acta Alimentaria Polonica* 15(1): 1989: 45-53

Yoghurts

1402
Hoppner (K) and Lampi (B). **Total folate, pantothenic acid and biotin content of yoghurt products.** *Canadian Institute of Food Science and Technology Journal* 23(4/5): 1990: 223-225

Milk proteins

1403
Gupta (VK) and Mulay (CA). **Studies on sodium and calcium caseinates prepared from fresh and sour buffalo milk edible caseins. Part. II. Some physical and functional characteristics.** *Indian Journal of Dairy Science* 42(3): 1989: 595-600

Results indicate that calcium caseinates not only show lower overrun but also lesser whip stability as compared to sodium caseinates, irrespective of the edible casein from different TA milks from which they are prepared. Hence sodium caseinates may be preferred over calcium caseinates in food systems where better whipping ability is desired. SRA

Caseins

1404
Anastasia (JV), Braun (BL) and Smith (KT). **General and histopathological results of a two-year study of rats fed semi-purified diets containing casein and soy protein.** *Food and Chemical Toxicology* 28(3): 1990: 147-156

Two semi-purified diets, identical except for protein (soya or casein), and a Purina chow diet were fed to groups of Sprague-Dawley rats and compared over a 22-month period for effects on body wt., organ wt., feed consumption, feed efficiency, protein efficiency, organ-to-body-wt. ratios, certain organ mineral levels, gross pathology and histopathology. Feed efficiency, protein efficiency, body wt. and most organ wts were higher in the groups fed soya and casein, while feed consumption and most organ-to-body-wt ratios were relatively lower. Significant increases in the final pathology findings in the groups fed soya and casein included nephrocalcinosis (in females), hepatocellular vacuolization, gastric trichobezoars (hairballs), ulcerative pododermatitis (hock ulcers) and splenomegaly. This study demonstrates that the long-term feeding of semi-purified diets is feasible. Moreover, the differences observed between the protein sources, that is, soya and casein, were minimal, which suggests that either protein source is acceptable for long-term feeding studies. AS

MEAT AND POULTRY

1405
Bonnet (M), Denoyer (C) and Renou (JP). **High resolution ^{13}C NMR spectroscopy of rendered animal fats: Degree of saturation of fatty acid chains and position on glycerol.** *International Journal of Food Science and Technology* 25(4): 1990: 399-408

1406
Reddy (PM), Usha Mandokhot (V) and Chandiramani (NK). **A comparative study on heated adrenal and immunoglobin G antigen for identification of cooked meats of cattle and sheep.** *Journal of Food Science and Technology (India)* 27(4): 1990: 221-223

1407
Kounev (Z). **Procedures for recovery of stressed and injured cells of *Yersinia enterocolitica* from meat and meat products.** *Journal of Food Protection* 52(5): 1989: 360-362

Meat

1408
Schillinger (U) and Lucke (F-K). **Antibacterial activity of *Lactobacillus sake* isolated from meat.** *Applied and Environmental Microbiology* 55(8): 1989: 1901-1906

1409
Beriain (MJ), Sanchez-Monge (JM), Villanueva (R) and Bello (J). **A microscopial study of the structure of meat emulsions and its relationship to chemical additives.** *Anales de Bromatologia* 41(2): 1989: 349-357 (Es)

1410
Beriain (MJ), Miranda (J) and Bello (J). **Influence of chorizo curing process on the emulsifying properties of meat proteins.** *Anales de Bromatologia* 41(2): 1989: 359-366 (Es)

1411

Macleod (G). **Meaty talk.** *Food* 11(1): 1989: 53, 55-56

The author describes latest research into the meat flavour complex. Warmed-over flavour is one of the meat flavour complex that needs immediate solution, in view of the wide range of warmed-over, pre-prepared cooked meat dishes now available on the retail market. BV

1412

Smith (JP), Toupin (C), Gagnon (B), Voyer (R), Fiset (PP) and Simpson (MV). **A hazard analysis critical control point approach (HACCP) to ensure the microbiological safety of sous vide processed meat/pasta product.** *Food Microbiology* 7(3): 1990: 177-198

1413

Smith (JM) and LeBlanc (DI). **Evaluation of a low temperature meat cooker for the home.** *Canadian Institute of Food Science and Technology Journal* 23(4/5): 1990: 207-211

The purpose of this study was to compare the energy consumption, the cooking time, and the acceptability of meat or poultry prepared in a low temp. meat cooker with conventional meat cooking methods (i.e., panfrying and roasting). The low temp. method consisted of placing the meat in a plastic bag and cooking it in a water bath set at temp. of 65 to 96 C, depending on the type of meat and the final internal temp. required. Loin pork chops, boneless beef rump roasts and chicken legs were cooked using both the low temp. cooker and conventional cooking methods. The low temp. meat cooker was found to be energy efficient as it used resp., 8%, 15% and 51% of the energy required to cook chicken legs, boneless beef rump roasts and loin pork chops by conventional methods. The cooking time for loin pork chops in the low temp. meat cooker was almost double that for panfrying. Boneless beef rump roasts took a third more cooking time in the low temp. cooker than by the conventional roasting method. However, chicken legs prepared in the low temp. cooker took half the cooking time of those prepared by oven roasting. Sensory evaluation revealed that except for the appearance of the panfried pork chop which was better liked than the low temp. cooked pork chop, there were no differences in mean hedonic scores for appearance, texture, flavour and overall acceptability of the meat and poultry cuts cooked by both methods. AS

1414

Perales (I) and Audicana (A). **Evaluation of semisolid Rappaport medium for detection of salmonellae in meat products.** *Journal of Food Protection* 52(5): 1989: 316-319

Beef

1415

Smith (MG) and Davey (KR). **Destruction of *Escherichia coli* on sides of beef by a hot water decontamination process.** *Food Australia* 42(4): 1990: 195-198

1416

Yadav (BS) and Singh (LN). **Physico-chemical changes in buffalo skeletal muscles stored at refrigeration temperature.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 1-4

1417

Rao (MV), Govindarajulu (M) and Ramamurthi (R). **Studies on the preparation of meat protein concentrate (MPC) using beef tissue waste.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 31-36

1418

Anjaneyulu (ASR) and Sharma (N). **Influence of phosphate on functional properties of buffalo meat and palatability of patties containing reduced salt.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 72-75

1419

Anderson (ME) and Marshall (RT). **Interaction of concentration and temperature of acetic acid solution of reduction of various species of microorganisms on beef surfaces.** *Journal of Food Protection* 52(5): 1989: 312-315

Mutton

1420

Chandrapal (AN), Reddy (KS) and Reddy (PM). **The effect of marination on certain quality characteristics of mutton.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 11-17

Mutton from aged sheep was subjected for still-marination with 1.5% acetic acid and citric acid for 12 and 24 h at 2 different temp. of 5 and 30 C. Samples were evaluated for physico-chemical, microbial and organoleptic characteristics. A highly significant reduction in pH, cooking loss, extract release volume, water-holding capacity, shear force values, mesophilic and psychrotrophic bacterial counts were observed in both acetic and citric acid marinade treatments. The sensory evaluation revealed, a highly significant improvement in

juiciness, tenderness, consistency and texture due to marination. But there was no significant difference in the organoleptic qualities of colour, flavour and overall acceptance. Marination with acetic acid or citric acid of mutton from aged animals improved tenderness and keeping quality. AS

Goat

1421

Keshri (RC) and Sharma (N). **Lipid composition of goat bone marrow.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 67-71

Goat bone marrow was analysed for total lipid (TL), non-polar lipid (NL) and polar lipid (PL). Effect of storage and cooking of bones on lipid comp. of marrow and bone soup fat were determined. Major marrow lipid was triglycerides (TG). Phosphatidyl choline (PC) and phosphatidyl ethanolamine (PE) were predominant fractions of PL. Cooking influenced the lipid contents and pressure cooking released greater amount of NL from marrow to soup fat. Storage at room temp. and cooking by simmering resulted in increased TBA and free fatty acid values. AS

Goat meat balls

1422

Padda (GS), Sharma (N) and Bisht (GS). **Evaluation of fat sources and levels in goat meat balls.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 23-30

Highly acceptable goat meat balls could be prepared by using 10 to 15% goat fat (GF). Their acceptability could be further improved by using pork fat (PF) or hydrogenated vegetable oil (HVO) at 15 to 20% levels or their suitable combinations with GF. However, the use of PF and HVO alone provides soft texture to the product and the maintenance of integral shape of raw chilled or frozen goat meat balls may be a problem, necessiating pre-cooking for trading of such products. Cooking yields and retentions of fat and moisture were higher in meat balls prepared with 10 to 15% GF as compared to the ones with similar levels of PF or HVO. AS

Goat meat patties

1423

Vidarthi (VK), Padda (GS) and Singh (LN). **Effect of different levels of texturised soy proteins (TSP) on physico-chemical and organoleptic properties of goat meat patties.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 18-22

Goat meat patties (GMP) extended with 20% hydrated texturised soy proteins (TSP) showed better overall acceptability than the control. The patties with 50% TSP had poor acceptability as the flavour and texture of the products were affected seriously. GMP with TSP had better dimensional stability and increased retention of fat and moisture as compared to control. AS

Sheep

1424

Mahendrakar (NS), Dani (NP) and Amla (BL). **Effect of post-mortem conditioning treatments to sheep carcasses on electrophoretic patterns of muscle proteins.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 49-54

Bannur ewes (age: 4-5 yrs; Live wt.: 20.3 - 21.6 kg) were sacrificed and carcasses split vertically into 2 halves. The half carcasses were subjected to either (i) Achilles tendon suspension at 2-3 C for 24 h (direct chilling, C_1) or (ii) Pelvic suspension at RT (26 plus or minus 2 C) for 7 h followed by chilling at 2-3 C for 17 h (delayed chilling, C_2). The data collected on thigh muscles from C_1 and C_2 carcasses were compared with those obtained on fresh (F) muscles dissected out within 1 h post-mortem. The SDS-PAGE patterns indicated that post-mortem conditioning treatment which led to stretching of muscles resulted into greater number of electrophoretic protein components compared to the contracted muscles. The increased number of protein bands in the stretched muscles was found to be due primarily to the proteolytic breakdown of high mole. wt. proteins rather than to mole. wt. fractions. AS

Pork

1425

Astiasaran (I), Villanueva (R), Sanchez-Monge (JM) and Bello (J). **The influence of pre- and post-rigor pork meat state on the integrity of meat proteins and their effect on some functional properties.** *Anales de Bromatologia* 41(2): 1989: 331-339 (Es)

1426

Beriain (MJ), Sanchez-Monge (JM) and Bello (J). **Influence of polyphosphates, citrate, acetate or lactate on the properties of the meat emulsion system containing 40%, 30% and 20% lean pork meat.** *Anales de Bromatologia* 41(2): 1989: 341-347 (Es)

1427

Nychas (GJ) and Arkoudelos (JS). **Microbiological and physicochemical changes in minced meats**

under carbon dioxide, nitrogen or air at 3 C. *International Journal of Food Science and Technology* 25(4): 1990; 389-398

Rabbits

1428

Hussain (A), Keshri (RC) and Sharma (N). **Carcass characteristics of spent rabbits and their meat quality.** *Indian Journal of Meat Science and Technology* 2(1): 1989; 5-10

The mean preslaughter live wt. of male and female New Zealand white rabbits of 2 yr of age were 1660 g and 1677 g. The eviscerated hot carcass wt. of these were 922 g and 913 g. Av. dressing percentage were 55.5 and 54.3. The meat bone ratio were 3.6 and 3.4 resp. Analysis of variance showed non-significant difference ($P<0.05$) between sexes for these traits. The mean per cent values of moisture, protein, ether extract and total ash of raw meat were 74.5, 19.5, 4.6 and 1.0 resp. for male and 72.7, 19.2, 6.9 and 1.1, resp. for female rabbits. Analysis of variance revealed significant difference ($P<0.05$) between the sexes with respect to moisture and ether extract, whereas, per cent protein and ash contents were not significantly different ($P<0.05$). Mean pH values of the male and female carcasses recorded within 1 h of post-mortem were 6.46 and 6.38. Mean pH values of minced meat from male and female at 3 h (post-mortem) dropped to 6.05 and 5.99 resp. There were no significant differences ($P<0.05$) in pH values between the sexes. The water holding capacity (WHC) of the minced meat of male and female were 4.63 and 4.55 square cms resp. The analysis of variance showed no significant ($P<0.05$) difference. AS

Products

1429

Salahuddin (M), Kondaiah (N) and Anjaneyulu (ASR). **Quality of pre-cooked kababs under refrigerated storage.** *Indian Journal of Meat Science and Technology* 2(1): 1989; 58-60

Microbial status, oxidative activity and sensory quality of the pre-cooked kababs from chicken, mutton and combination of the 2 meats were studied under 2 wks of refrigerated storage. Storage had a significant effect on microbial counts; the counts tended to decrease on 5th and 10th days. The counts on 15th day did not differ significantly from those on 10th day. There was no indication of incipient spoilage. The effect of type of meat, period of storage and their interaction was significant for TBA values. However, the values remained low throughout the study. Significant effect of type of meat and period of storage was also observed on the sensory quality of kababs. The order of preference was chicken combination mutton. The sensory scores for appearance, juiciness, texture and mouth coating remained similar throughout the period of storage. However, flavour and overall palatability scores were comparatively lower on 15th day. The product could be stored for 10 days at 5 plus or minus 1 C without any appreciable loss of quality and consumer acceptability. AS

1430

Lynch (DJ) and Potter (NN). **Effects of acidification and processing variables on thermal inactivation of *Bacilus coagulans* spores in meat particulates.** *Journal of Food Protection* 52(5): 1989; 320-328

Poultry

Chickens

Broilers

1431

Pander (BL) and Jitendra Kumar. **Growth, carcass yield and conformation traits in two parent lines of broiler.** *Indian Journal of Poultry Science* 25(3): 1990; 163-166

Data on 80 cockerels of sire line and 90 cockerels of dam line were analysed to study the differences in the 2 lines and association among shank and keel length, breast angle, preslaughter live wt., eviscerated wt. and evisceration %. Breast angle and keel length were 4.74 and 1.91 cm more resp. in cockerels of sire line than the dam line. Preslaughter live wt. and eviscerated wt. were also higher in cockerels of sire line. All the conformation traits had significant and positive correlation with eviscerated % except breast angle. The sire line had better body conformation. AS

1432

Abdullah (MI) and Ismail (WLW). **Keeping quality of chilled and frozen cockles.** *ASEAN Food Journal* 5(3): 1990; 96-102

Cockles (*Anadara granosa*) were stored live in perforated polyethylene bags at 10 C. It was found possible to increase the time cockles remain alive out of water with acceptable meat quality from 4 days at ambient temp. to over 2 wks at 10 C. Evaluation of odour, texture, flavour and general acceptability was based on cockle meat after immersion in boiling water. The shelf-life of blanched, frozen and glazed cockle meats was about 11 months at -30 C. During the storage period, moisture content decreased and thiobarbituric acid

(TBA) values increased. Protein solubility in 5% NaCl fluctuated during storage, but the texture and overall taste changed little. AS

Ducks

1433

Rao (NV) and Prabhakar Reddy (K). **Effect of age and sex on quantitative and qualitative characteristics of duck meat.** *Indian Journal of Poultry Science* 25(1): 1990: 32-36

Khaki Campbell ducklings were slaughtered at 3, 4, 5 and 6 months of age and the carcass quantity and quality was studied. The live wt. increased upto 4 months as the age of the birds increased in both the sexes. Males showed higher live wt., ready-to-cook yield and lesser giblet yield. Meat from 3 months old ducks had higher moisture, protein and less ether extract contents than from other age groups. Thigh meat from duck carcasses had lower extract release volume (ERV), thiobarbituric acid (TBA) values, moisture and protein content and higher ether extract and pH than breast meat. ERV and TBA values of duck meat increased with age. Cooked meat from 3 months aged ducks was superior in tenderness, juiciness and flavour scores to others. No significant difference was observed in the sensory quality of breast and leg meat, except tenderness. GS

Pigeon

1434

Keshri (RC) and Sharma (N). **Proximate composition of pigeon meat.** *Indian Journal of Meat Science and Technology* 2(1): 1989: 37-42

Proximate comp. of raw and cooked meat from thigh and breast of squabs and adult pigeons were determined. The mean values for moisture, protein, ether extract and total ash of raw meat were 76.0, 19.4, 2.4 and 1.2% resp. Ca and P contents were 67.4 and 231.0 mg/100 g of raw meat. The corresponding values of cooked meat were resp. 60.1, 32.7, 4.8 and 1.1% and 31.5 and 207.6 mg/100 g. Significant differences ($P<0.05$) were observed in the comp. of squabs and adults and also between thigh and breast muscles. Protein % was higher in breast than thigh meat. AS

Quail

1435

Mohan (B), Narahari (D) and Alfred Jayaprasad (I). **Influence of age and sex on tenderness and organoleptic characteristics of Japanese quail (*Coturnix coturnix japonica*) meat.** *Indian Journal of Poultry Science* 25(2): 1990: 93-96

The muscle fibre diam, shear force value and sensory assessment of male and female quails were done at 6th and 8th wk of age. Irrespective of the sex, as the age advanced a marked increase was observed in the muscle fibre diam. and shear force value. Eight wk old males showed higher muscle fibre diam. and shear force value, but sensorily more acceptable than female quail. Six wk quail meat was found to be more tender with overall higher acceptability than 8 wk old quail meat. AS

1436

Singh (RP) and Panda (B). **Effect of polyphosphate chilling on the quality of frozen quail meat.** *Indian Journal of Poultry Science* 25(3): 1990: 204-210

The effects of chilling quail carcass in slush-ice with or without 5% sodium tripolyphosphate (STPP) for 4 h on the cooling of carcass, water uptake and subsequent frozen (-10 C) storage of chilled carcasses for 4 months on some physico-chemical, functional and sensory quality of meat were investigated. Results showed that the carcass internal temp. decreased from 27 to 2.5 C within first 45 min of wet chilling. % water uptake was significantly ($P<0.01$) higher and % wt., drip and cooking losses on frozen storage were lower for phosphate-treated carcasses than for untreated group. Polyphosphate significantly ($P<0.01$) increased meat pH (by 0.20/unit) retarded lipid oxidation and caused decline in extractability of myofibrillar proteins, water-holding capacity and sensory quality of meat during frozen storage. AS

Products

Eggs

1437

Thind (SS). **Hard cooked egg products.** *Poultry Guide* 27(11): 1990: 80-83

Methods have been standardized for the preparation of hard cooked eggs and their products like pickled eggs, deviled eggs, scotch egg, egg salad and long eggs. The quality of eggs suitable for hard cooking and the method of hard cooking each product is described including the steps involved in the preparation, method of maufacture and packing involved. Pretreatment, if any, needed before it is being consumed, has also been indicated. GS

1438

Ashok Singh. **Abnormalities in poultry egg.** *Poultry Guide* 28(1): 1990: 26-29

A general article covering the external and internal abnormalities observed in eggs. External abnormalities are related to size, shape and shell surface. The internal abnormalities are in yolk size and yolk number and the yolk defects include ruptured yolk, abnormal shape and dark spots. Worms and parasites and foreign bodies in hen s egg have also been included. KAR

1439
Ma (C-Y), Sahasrabudhe (MR), Poste (LM), Harwalkar (VR), Chambers (JR), O'Hara (KPJ). **Gamma-Irradiation of shell eggs. Internal and sensory quality, physicochemical characteristics, and functional properties.** *Canadian Institute of Food Science and Technology Journal* 23(4/5): 1990: 226-232

Fresh shell eggs subjected to γ-irradiation (0.97, 2.37 and 2.98 kGy) showed marked deterioration in internal quality as indicated by the loss in Haugh values and yolk colour. Sensory analysis indicated a significant detectable difference (P less than or equal to 0.01) between the control and irradiated eggs. Irradiation caused a decrease in apparent viscosity of liquid egg white and whole egg, but the viscosity of egg yolk was increased. Polyacrylamide gel electrophoresis of egg white proteins revealed the appearance of some minor bands in the irradiated samples. Differential scanning calorimetry of albumen from irradiated eggs showed no significant (P greater than or equal to 0.05) changes in temp. and enthalpy of denaturation. Irradiation at 2.37 and 2.98 kGy led to increases in emulsification activity, whipping power and foam stability of egg white, and the gel rigidity was increased. Angel cakes prepared from irradiated egg white had lower batter density and higher cake volume. AS

Sausages

1440
Anand (SK), Pondey (NK), Mahapatra (CM) and Verma (SS). **Microbial profile of chicken sausages during preparation and storage.** *Indian Journal of Poultry Science* 25(2): 1990: 97-102

Microbial profile was assessed in ingredients added to sausages and during various stages of processing including dressed birds, minced meat, sausage emulsion, sausage casing, filled sausage, dry cooked (125 C for 25 min.), moist cooked (80 C for 20 min.) and deep fried sausage and during refrigerated storage as also in spices and condiments added to the sausages. The microbes encountered included coliforms, KF-streptococci, staphylococci, yeasts and moulds and psychrotrophs. Multiplication was max. during emulsion making; cooking reduced the microbial content of raw sausages by at least one log cycle. During refrigerated storage (5 plus or minus 1 C) yeasts and moulds were absent in dry cooked and moist cooked sausages, but all others listed above were present to varying extent. Refrigerated shelf-life of raw sausage was 7 days whereas it was 9 and 10 days in dry and moist cooked sausages resp. Among the spices added pepper had highest counts (6.71 log/g) whereas capsicum and clove showed a count of 3.00 and 3.04 log/g resp. Coliforms were found in black pepper, cardamom, capsicum and anise, whereas *Bacillus cereus* was isolated from anise, cinnamon, cumin and black pepper. Yeasts and moulds ranged from 0.83 - 3.45 log/g. KAR

SEAFOODS

Clams

1441
Mishra (R) and Srikar (LN). **Effect of processing on meat quality of clams (*Meretrix casta*).** *Journal of Food Science and Technology (India)* 27(4): 1990: 244-246

Meat quality during different stages of processing viz. depuration, shucking, blanching and freezing was evaluated in the clam (*Meretrix casta*). Glycogen content varied significantly while total lipid did not vary during all the stages of processing . Water soluble protein (WSP) and salt soluble protein (SSP) contents of the meat decreased significantly during shucking and blanching resp. Peroxide value (PV) and alpha-amino nitrogen during shucking and total volatile base nitrogen during blanching increased significantly. AS

Oysters

1442
Cook (DW) and Ruple (AD). **Indicator bacteria and vibrionaceae multiplication in post-harvest shell stock oysters.** *Journal of Food Protection* 52(5): 1989: 343-349

Snails

1443
Colomber (Y) and Clotet (R). **Biochemical parameters in snail meat (*Helix aspersa*) and its evolution during fast.** *Anales de Bromatologia* 41(2): 1989: 213-221 (Es)

1444

Bakre (PP), Misra (V) and Bhatnagar (I). **Residues of organochlorine insecticides in fish from Mahala water reservoir, Jaipur, India.** *Bulletin of Environmental Contamination and Toxicology* 45(3): 1990: 394-398

1445

Lakshmanan (PT), Varma (PRG) and Iyer (TSG). **Studies on the quality changes of frozen fish in retail cold stores.** *Fishery Technology* 28(1): 1991: 42-50

Marine fish like black p omfret (*Parastromateus niger*), white p omfret (*Pampus argenteus*), seer fish (*Scomberomorus* sp.) and brakish water sp., pearl spot (*Stroplus suratensis*) and mullet (*Mugil cephalus*) were frozen at -40 C and kept at -11.2, -4.43, -10.4, -11.25 and -4.55 C and at -18 C (controlled temp.) and were evaluated for shelf-life and quality by sensory, biochemical and microbiological changes. Sensory assessment showed significant variation in the overall acceptability scores for the same sp. kept at different stores. It was found that fishes could be kept in good quality up to 10 - 12 wk if the temp. is maintained -10 C. The TBA value increased fast in black pomfret and seer fish kept at -4.43 C and white pomfret and mullet kept at -4.55 C. The hypoxanthine content increased with length of storage time and increased temp., the rate of increase was fast at -4.43 and -4.55 C. The TBA values also increased with storage and the increase was more at higher temp. The sensory characteristics and chem. indices indicate that the quality deterioration was rapid at -4.43 and -4.55 C. Bacteriologically all the samples were free from pathogenic organisms; total bacterial count ranged from 10^{2} to 10^{4}g of muscle. Total plate count decreased with storage period in most cases except in those stored at -4.43 and -4.55 C. SRA

1446

Narayanan Nambiar (V) and Mahadeva Iyer (K). **Distribution of *Salmonella* serotypes in fish in retail trade in Kochi.** *Fishery Technology* 28(1): 1991: 33-37

The distribution of *Salmonella* and the serotypes in fresh and frozen fish in retail trade in Cochin was assessed. It has shown that 9 out of 156 fresh (5.76%) and 11 out of 127 frozen fish samples (8.66%) were salmonellae contaminated. The 32 strains isolated belonged to 16 serotypes and these included rarely occurring serotypes like *S. adelaide*, *S. braendrup*, *S. chingola*, *S. cerro*, *S. ncanga*, *S. oslo*, and *S. mbandka*. Serotypes *S. braendrup*, *S. emek* and *S. adelaide* were isolated from fresh as well as frozen fish and others were isolated from either fresh or frozen fish. SRA

1447

Ravindranathan Nair (P), George Joseph (K), Unnikrishnan Nair (TS) and Cyriac Mathen. **A preservation process for ready-to-cook fish portions at room temperature.** *Seafood Export Journal* 22(7-8): 1990: 45-47

A preservative formulation containing calcium propionate, citric acid, sodium chloride, turmeric powder and chilly powder was used to treat fish to extend the storage life at room temp. The 8 sp. of fish: yellow dog shark (*Scoliodon sorrakowah*), milk fish (*Chanos chanos*), black king fish (*Rachycentron canadus*), drab jew fish (*Johnish sina*), Indian oil sardine (*Sardinella longiceps*), Indian mackerel (*Rastrelliger kanagurta*), mackerel tuna (*Euthynus affinis*) and mullet (*Mugil parsiar*) after mixing with preservatives could be stored for 1 - 4 days at room temp. in edible condition. It was observed that the standard plate count was first reduced and then increased and after 4 days reached the original level. The total volatile N and TMA values were 28.0 and 5.6 mg % even after 4 days of storage. KAR

1448

Jantawat (P) and Yamprayoon (J). **Effects of washing, chemical additives and storage temperature on quality of mechanically deboned by-catch.** *ASEAN Food Journal* 5(3): 1990: 108-113

Washed and unwashed mechanically deboned by-catch samples with and without chem. treatment of 0.1% sodium benzoate + 0.1% sodium tripolyphosphate pr 0.1% sodium erythorbate + 0.1% sodium tripolyphosphate, and their corresponding fishball samples were stored at 0 C or 7 C. The mince samples were evaluated for total volatile base (TVB) N, trimethylamine (TMA) N, thiobarbituric acid (TBA), salt soluble protein (SSP) and total bacterial count (TBC). The fishball samples were evaluated by sensory means for flavour and acceptability. Significantly lower TVBN, TMAN, TBA and higher SSP were obtained with saline solution washing. The benzoate-phosphate treatment effectively controlled TVBN and TBC in the mince samples. Lower storage temp. was more effective in preserving quality of the fish samples. Samples prepared by washing, adding benzoate-phosphate and storing at 0 C are suitable for use in batter type products, for up to 13 days, while those with the same treatment stored at 7 C should be should be used within 11 days. AS

Sardines

1449

Shetty (TS), Setty (TMR) and Ravishankar (CN). **Quality changes in Indian oil sardine (*Sardinella longiceps*) during storage in chilled sea water.** *Fishery Technology* 28(1); 1991; 51-54

Study on physical, chem., microbiological and organoleptic changes during chilled sea water (CSW) storage of fish immediately after catch and kept in chill room at 2 plus or minus 1 C was undertaken at regular intervals. An increase in moisture and ash content and decrease in fat and protein contents during 10 days storage in chilled sea water was observed. The volatile base N and trimethylamine nitrogen increased during storage. The peroxide value showed a gradual and steady increase during storage; but were much below the acceptability limits of 20 to 40 milli eq. oxygen/kg fat. The increase in free fatty acids content was slow, but the salt content was 0.52% at the end of 10 days. The initial total plate count (TPC) of 2.10×10^4/g of flesh reached 7.6×10^6/g of flesh on the 10th day whereas the TPC of the sea water was increased from its initial value of 1.6×10^3/ml to 2.8×10^7/ml. The result shows that the fish was graded as excellent both in raw and cooked condition till the 5th day, and was in acceptable condition for 8 days while unacceptable on 10th day. SRA

1450

Jeyasekaran (G) and Saralaya (KV). **Influence of fish chilling methods on the quality of white sardine.** *Fishery Technology* 28(1); 1991; 55-58

White sardine (*Kowala coval*) from a commercial fishing boat was (i) kept at ambient temp. of 28 plus or minus 2 C for 6 h and later held in crushed ice (ii) mixed with crushed ice in 1:1 ratio immediately after catch (iii) kept in chilled seawater with fish:ice:water ratio of 9:3:1 soon after catch. All were held in a chill room at 0 - 5 C. Physical, organoleptic, microbiological and biochemical tests at intervals of 2-3 days were made. Results show that most of the major changes indicating loss of freshness and onset of spoilage occur in (i), (ii) and (iii) after 4, 6 and 9 days of storage, resp. The moisture content increased and protein decreased in all the samples during storage. The salt soluble protein decreased faster in (i) than in (ii) and (iii) which influenced the texture, flavour and taste. The total volatile base N reached between 15 and 17 mg % in (i) - (iii) and trimethylamine N also increased. The peroxide value and thiobarbituric acid showed faster rate of change in (i) than in (ii) or (iii) indicating the impact of initial delay in chilling. SRA

Yellowtail fish

1451

Berhimpon (S), Souness (RA), Buckle (KA) and Edwards (RA). **Salting and drying of yellowtail (*rachurus mccullochi* Nichols).** *International Journal of Food Science and Technology* 25(4); 1990; 409-419

Wet salting of low-fat yellowtail using 3 brine solutions (15%, 21% and saturated salt) and drying of salted fish at 35 C and 50% RH, 45 C and 30% RH, or 55 C and 18% RH was carried out and assessments made of salt and moisture contents, water activity, and sensory properties of dried-salted fish. Brine concn. during salting and the drying conditions had a significant effect on the drying rate. Brining in saturated brine gave the most rapid rate of reduction in moisture content and the lowest final moisture content during brining, but produced a slower rate of reduction of moisture and higher final moisture content during drying. Fish brined in saturated salt and dried at 55 C was of lower sensory quality. AS

Products

Fish

1452

Chakrabarti (R). **Histamine content in dried fish products from Kakinada coast.** *Fishery Technology* 28(1); 1991; 59-62

Dried fish of 31 var. collected at random from local fish market of Kakinada, India were analysed. It was found that meat of the gutted, cured and dried fish contained histamine within 10 mg/100 g of muscle. These included *Trichiurus haumela*, *Stremateus sinensis*, *Mugil keloarti*, *Mugil cephalus*, *Sciaenids* sp., *Kowala coval*, *Chanos chanos*, *Saurida tumbil*, *Olige* sp., *Carangids* sp., *Cynoglossus* sp., *Arius* sp., *Leiognathus equulus* and *Nemipterus japonicus*. Histamine content in ungutted, salted and dried fish was more than that in gutted, salted and dried fish. In whole dried mackerel histamine was 80.6 plus or minus 48.22 mg %. Sun-dried unsalted whole fish had histamine 15 mg/100 g. During summer, histamine level in whole sun-dried big white bait reached above 100 mg/100 g in a few cases and histamine level became almost half during winter. Total volatile base N did not show any correlation with the histamine content in fish. SRA

PROTEIN FOODS

Infant foods

1453
Castricheo (R), Sanchez (F), Aguayo (M), Ballester (D) and Yanez (E). **Development and chemical and nutritional evaluation of an infant food based on sweet lupin, wheat and milk.** *Archivos Latinoamericanos de Nutricion* 39(2): 1989: 141-149 (Es)

1454
Barrado (E), Salgado (ME), Pardo (R), Tesedo (A) and Romero (H). **Comparative study of Zn, Cd, Pb and Cu levels between cow milks and infant formulas.** *Anales de Bromatologia* 41(2): 1989: 249-259 (Es)

1455
Wollard (DC), Pybus (J) and Woollard (GA). **Aluminium concentration in infant formulae.** *Food Chemistry* 37(2): 1990: 81-94

Increased loading of aluminium (Al) in infants, particularly neonates, is known to be potentially toxic because of their renal immaturity. Any exposure to Al from milk replacement formulae may represent a risk. There have been few extensive studies done on the Al content of these products and therefore 307 samples from 14 countries were analysed for Al by flameless atomic absorption. On a global basis the mean Al concn. was found to be 1.40 mg/kg with a 95% interval of 0.17 - 3.84 mg/kg. In the New Zealand and Australian products, the mean and range of the Al levels in infant formulae are statistically the same as in standard whole milk powders despite their more sophisticated processing and their storage in Al cans. The Al concn. of 55 soya-based (dairy free) milk substitutes from seven countries is much higher, global mean = 18.4 mg/kg, 95% interval 10.4 - 37.6 mg/kg. Vegetable oil and vitamin/mineral additives were shown to contribute insignificantly to the overall Al content of these products. AS

1456
Paul (SC) and Mathur (BN). **Influence of mode of incorporation of maltodextrin in infant formulation on the physico-chemical characteristics of spray dried product.** *Indian Journal of Dairy Science* 42(3): 1989: 529-533

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

1457
Castle (L), Mayo (A), Crews (C) and Gilbert (J). **Migration of poly (ethylene terephthalate) (PET) oligomers from PET plastics into foods during microwave and conventional cooking and into bottled beverages.** *Journal of Food Protection* 52(5): 1989: 337-342

Alcoholic beverages

Wines

1458
Yusty (MAL), Jares (CMG), Lozano (JS) and Pineiro (MEA). **A rapid gas-chromatographic method for direct evaluation of ethanol and glycerine in wines.** *Anales de Bromatologia* 41(2): 1989: 375-381 (Es)

Non-alcoholic beverages

Coffee

1459
Aeschbacher (HU) and Jaccaud (E). **Inhibition by coffee of nitrosourea-mediated DNA damage in mice.** *Food and Chemical Toxicology* 28(9): 1990: 633-637

Oral administration of coffee at doses ranging from 150 mg to 1 g/kg body wt. significantly decreased endogenously formed nitrosourea-mediated DNA damage in bone marrow as well as in colon epithelial cells in mice that had simultaneously received oral administration of methylurea and sodium nitrite. Since coffee (1 g/kg body wt.) did not decrease DNA damage when administered orally together with preformed methylnitrosourea, it was hypothesized that coffee inhibits nitrosation in the stomach of mice. The lowest effective level of coffee, when compared on the basis of body wt., corresponds to a human intake of about 5 cups of coffee. Both chlorogenic acid (150 mg/kg body wt.) and premelanoidins (1 g/kg body wt.), which occur as ingredients in, or are formed during roasting of, coffee, were shown to inhibit nitrosourea-induced DNA damage in mice. AS

1460
Rinkus (SJ) and Taylor (RT). **Analysis of hydrogen peroxide in freshly prepared coffee.** *Food and Chemical Toxicology* 28(5): 1990: 323-331

Coffee has been shown unequivocally to be genotoxic *in vitro*, but no genotoxicity has been seen in *in vivo* testing. Since the *in vitro* genotoxicity appears to be dependent on hydrogen peroxide, it is important to know whether hydrogen peroxide is present in prepared coffee and whether it is being formed

during the *in vitro* testing. A procedure to measure hydrogen peroxide in prepared coffee using disposable reversed-phase columns to decolourize the coffee and retain its catechols has been devised. Hydrogen peroxide was assayed in the eluate from the columns by two chromogenic methods: horseradish-peroxidase-mediated oxidation of phenol red and non-enzymatic oxidation of iodide. Three brands of brewed and instant coffee prepared in the manner recommended to the consumer were studied. Although 6 of the 12 preparations of coffee contained 3-29 µM-hydrogen peroxide, in the other 6, none could be detected. Sampling, batch, and ageing effects may contribute to the variability in the testing, but there is no indication of 100 µM-hydrogen peroxide levels in freshly prepared coffees, as reported in the literature using other methods. Hydrogen peroxide did form slowly in prepared coffee as the beverage became oxygenated, but it formed quickly if the coffee was diluted by addition to an oxygen-containing solution at neutral pH and then incubated at 37 C. These results strongly suggest that adventitious formation of hydrogen peroxide is a confounding factor in the analytical and *in vitro* genotoxicological testing of coffees. AS

1461

Malhotra (GS) and Mann (RS). **Studies on the formulation of ready-to-reconstitute coffee complete powder.** *Indian Journal of Dairy Science* 42(3); 1989; 554-557

The formulation of coffee complete powder with suitable combination of ingredients and its storage stability under ambient conditions and physico-chemical and sensory changes has been studied. Four different formulations containing coffee, whole milk powder and sugar with 0.2% stabiliser and 0.5% free flowing agent were prepared by dry blending, packed in metalised polyester-LDPE laminate and stored at 30 plus or minus 1 C. It was observed that the pH, bulk density and dispersibility decreased significantly, while the solubility index, free fat and wettability time increased during storage. Increase in the angle of repose decreased the flow property. The sensory data revealed that the acceptable formulation was C3 prepared by incorporating coffee, whole milk powder and sugar in a ratio of 1:4:6 and this product could be stored for more than 3 months without refrigeration in a laminated pouch, and its production is commercially feasible. The reconstitution of coffee complete powder into drink is convenient and acceptable as conventionally prepared coffee. SRA

Fruit juices

1462

Chandler (BV). **Fruit juice review. 3.** *Food Australia* 42(4); 1990; 191-193

Covers raw materials, juice processing (citrus fruits and other fruits), packaging and storage, chem. analysis and comp. authentication of fruit juice, and industries. BV

Apple juices

1463

Mitek (M) and Drzazga (B). **Interrelation between the effect of enzymatic clarification of apple juices and the amount and quality of polyphenols. Part II. Changes of polyphenols during the production of apple juice and their effect on pectinolysis.** *Acta Alimentaria Polonica* 15(1); 1989; 3-13

1464

Cliff (M) and Dever (M). **Characterization of varietal apple juices.** *Canadian Institute of Food Science and Technology Journal* 23(4/5); 1990; 217-222

Sensory and analytical analyses were used to characterize 10 varietal apple juices. Using descriptive analysis, 14 judges evaluated 13 attributes in each of the juices. Eight attributes were used consistently and reproducibly (yellow, pink, fruity, cooked fruit, sweet, sour, astringent, body). Analyses of variance and principal component analysis of the scores showed distinct colour, aroma and taste differences among the var. Although there was compositional differences among the juices, it was the aromatic differences, discriminated by judges, which uniquely differentiated the juices. AS

Guava juices

1465

Hodgson (AS), Chan (HT), Cavaletto (CG) and Perera (CO). **Production of partially clarified guava juice and concentrate.** *ASEAN Food Journal* 5(3); 1990; 120-122

Pear juices

1466

Beveridge (T), Meheriuk (M) and Harrison (JE). **The influence of controlled atmosphere storage on browning of d'Anjou pear juice and concentrate.** *Canadian Institute of Food Science and Technology Journal* 23(4/5); 1990; 233-235

Nonenzymatic browning rates were followed in juice and conc. of d'Anjou pears stored for 90, 150 and 210 days in an atm. of 2% oxygen and 1% carbon dioxide at 0 C. Conc. from pears stored for 210 days browned significantly faster at 80 C than conc. produced from pears stored for 90 or 150 days. Storage time did not affect the browning rates of the juices. AS

Tea

1467
Koch (KR). **Quantitative determination of aluminium in tea by means of aluminium-27 nuclear magnetic resonance spectroscopy.** *Analyst (London)* 115(6): 1990: 823-825

A method for detn. of aluminium in tea leaf digests and tea infusions by means of ^{27}Al NMR spectroscopy is discussed. N.

FATS AND OILS

1468
Anon. **Survey by a working party of the DGF, 111th report: Steaming of edible fats and oils for deodorization and deacidification. VI.** *FAT Science Technology* 92(3): 1990: 115-118 (De)

1469
The Solvent Extractor's Association of India. **Solvent extraction industry: Status and prospects.** *Chemical Age of India* 40(11): 1990: 523-526

1470
Khan (RA). **Potential and production of solvent extracted oil.** *Chemical Age of India* 40(11): 1990: 531-533

Fats

1471
Munro (IC). **Issues to be considered in the safety evaluation of fat substitutes.** *Food and Chemical Toxicology* 28(11): 1990: 751-753

Oils

1472
Kowalski (B) and Kot (B). **Thermoanalytical investigations of edible oils and fats. Part II. Kinetics of thermo-oxidative decomposition of soybean and sunflower oils.** *Acta Alimentaria Polonica* 15(1): 1989: 55-62

Soybean and sunflower oils were oxidized in an atm. of oxygen in the cell of the Differential Scanning Calorimeter. The peak max. temp. on monitored differential heat flow curves were measured and used for the calculation of Arrhenius activation energy and kinetic parameters of the process. AS

1473
Weber (K). **The Carrousel extractor in modern extraction techniques.** *Chemical Age of India* 40(11): 1990: 537-546

1474
Verschuren (PM) and Zevenbergen (JL). **Safety evaluation of hydrogenated oils.** *Food and Chemical Toxicology* 28(11): 1990: 755-757

1475
Sil (S), Chakrabarti (J) and Gandhi (RS). **Sterol profile of the seed oils of a few members of compositae family.** *Journal of Food Science and Technology (India)* 27(4): 1990: 234-235

Corn oils

1476
Homberg (VE) and Bielefeld (B). **Sterol and fatty acid composition in germ oil.** *FAT Science Technology* 92(3): 1990: 118-121 (De)

The sterol and fatty acid comp. of 10 various wheat samples and one maize sample were investigated as well in the germ as in the endosperm to determine characteristics for identity and purity controls. A constantly low content of stigmasterol and an extremely high total sterol content are criteria for pure wheat germ oil. Another characteristic is the presence of small amounts of 5-dihydrositosterol and 5-dihydrocampesterol from lipids of the endosperm in germ oils obtained by technology. AS

Olive oils

1477
Perez (FY), Sans (RG) and Chozas (MG). **Stability assays for olive oil subjected to an accelerated autooxidation method by heating.** *Anales de Bromatologia* 41(2): 1989: 223-232 (Es)

Palm oils

1478
Chiao (KW). **Hot water for heating palm oil fractions.** *ASEAN Food Journal* 5(3): 1990: 125-126

Soybean oils

1479

Lee (S-H) and Min (DB). **Effects, quenching mechanisms, kinetics of carotenoids in chlorophyll-sensitized photooxidation of soybean oil.** *Journal of Agricultural and Food Chemistry* 38(8): 1990: 1630-1634

The effects of 0, 1.75 x 10^{-5}, 3.50 x 10^{-5}, and 5.25 x 10^{-5} M lutein, zeaxanthin, lycopene, isozeaxanthin, and astaxanthin which contain 10, 11, 11, 11 and 13 conjugated double bonds, resp., on the photooxidation of soybean oil containing 4.4 x 10^{-9} M chlorophyll were studied by measuring peroxide values of the oil. The antioxidant effectiveness of the carotenoids increased as the number of conjugated double bonds of carotenoid increased. The peroxide value of oil containing the carotenoid with 10 conjugated double bonds was significantly higher ($P<0.05$) than the oil containing carotenoids with 11 or 13 conjugated double bonds at the concn. of 5.25 x 10^{-5} M. The quenching mechanisms and kinetics of the above carotenoids in the photooxidation of soybean oil containing 3.3 x 10^{-9} M chlorophyll were studied by measuring the headspace oxygen depletion of oil bottle using gas chromatography. The carotenoids quenched singlet oxygen to reduce the chlorophyll-sensitized photooxidation of soybean oil. The total singlet oxygen quenching rate constants of lutein, zeaxanthin, lycopene, isozeaxanthin, and astaxanthin were 5.72 x 10^{9}, 6.79 x 10^{9}, 6.93 x 10^{9}, 7.39 x 10^{9} and 9.79 x 10^{9} $M^{-1}s^{-1}$, resp. AS

1480

Ramakrishna (G), Thirumala Rao (SD) and Azeemoddin (G). **Green colour in processed oils of black soybean.** *Journal of Food Science and Technology (India)* 27(4): 1990: 233

Alkali-neutralized oils from black soybean develop a deep green to bright green colouration on contact with metals like Ni, Fe, Zn and Cu. On bleaching with activated earth and activated carbon, the colour gets decolourised. AS

Sunflower oils

1481

Yodice (R). **Nutritional and stability characteristics of high oleic sunflower seed oil.** *FAT Science Technology* 92(3): 1990: 121-126

Nutritional and stability studies were conducted on high oleic acid (-80%) sunflower oil. Results indicated decrease in cholesterol and LDL and no change in HDL. In accelerated oxidation studies, the high oleic acid sunflower oil was found to be more stable than other unsaturated oils. N

SPICES AND CONDIMENTS

Turmeric

1482

Buescher (R) and Yang (L). **Aluminium stabilizes turmeric in pickle brine against decomposition by light, heat and peroxidase.** *Journal of Food Biochemistry* 14(4): 1990: 263-271

Turmeric in solutions typically used for cucumber pickle manufacturing was protected by Al^{3+} from decomposition caused by flourescent light, heat and peroxidase. Levels of 1.3 - 1.5 mM Al^{3+} significantly reduced light- and peroxidase-catalyzed decomposition of turmeric, and the amount of retardation increased with increasing Al^{3+} concn. Alone, neither peroxidase nor hydrogen peroxide affected turmeric; however when combined, turmeric was rapidly destroyed. Peroxidase destruction of turmeric was uncompetitively inhibited by Al^{3+}. Turmeric decomposition increased with increasing temp. from 20 to 90 C. No thermal destruction of turmeric was observed in the presence of 2 or 4 mM Al^{3+}. AS

SENSORY EVALUATION

Nil

FOOD STORAGE

1483

Grant (JA), Parker (BL) and Damardjati (DS). **Controlled-release insecticides for stored-grain pest control in Indonesia. II. Warehouse trial.** *ASEAN Food Journal* 5(2): 1990: 71-78

This research paper assess the efficacy of various controlled-release (CR) liquid and tapes for suppression of stored-product insect pests in sack-stored milled rice, under tropical conditions. CR liquid or tape insecticides containing 2 or 10% chlorpyrifos (C), 2 or 10% malathion, or 2% chlorpyrifos-methyl, were tested for protection of milled rice. The lowest insect population and damage levels after 6 months, were found in gunny sacks pretreated with 10% - CCR-liquid and in the standard government (BULOG) treatment, which consisted of periodic pirimiphos-methyl sprays and aluminium phosphide fumigations. In residual

activity bioassays, the 10%-C-liquid treated gunny (aged 6 months) produced 99% mortality of *Sitophilus zeamais* in less than or equal to 12 h. BV

INFESTATION CONTROL AND PESTICIDES

1484

Obeng-Ofori (D) and Coaker (TH). **Some factors affecting responses of four stored product beetles (Coleoptera: Tenebrionidae and Bostrichidae) to pheromones.** *Bulletin of Entomological Research* 80(4): 1990: 433-441

Males of *Tribolium castaneum* (Herbst), *T. confusum* (Duval) (Tenebrionidae), *Rhyzopertha dominica* (Fabricius) and *Prostephanus truncatus* (Horn) (Bostrichidae) secrete aggregation pheromones attractive to both sexes. Responses of the four species to synthetic aggregation pheromones were investigated in relation to age, habituation, time of day, sex and previous mating experience in an olfactometer in which odour gradients were set up in moving air. Habituation reduced pheromone response in all the species tested but all recovered to pre-habituation levels after 48 h except *Tribolium* spp. males. Both sexes of *T. castaneum* and *T. confusum* were responsive to pheromone immediately upon eclosion, males reaching max. response after 19 and 21 days and females after 21 and 16 days, resp. Pheromone response was linearly related to age of the *Tribolium* spp. and *T. castaneum* males showed a greater response than the females. Sex or having mated did not affect the responses of *T. confusum*, *P. truncatus* and *R. dominica*. All the pheromones evoked periodicity of response, peaking between 10.00 and 18.00 h. AS

1485

Obeng-Ofori (D) and Coaker (TH). ***Tribolium* aggregation pheromone: monitoring, range of attraction and orientation behaviour of *T. castaneum* (Coleoptera: Tenebrionidae).** *Bulletin of Entomological Research* 80(4): 1990: 443-451

Adult male *Tribolium castaneum* (Herbst) secrete an aggregation pheromone that is attractive to both sexes. The responses of *T. castaneum* to different pheromone concn. (0.5, 1.0, 2.0, 4.0 and 8.0 mg/septa) were tested in the lab. In general, pheromone-baited pitfall and probe traps were over 50% more effective than unbaited traps. A curvilinear relationship between numbers trapped and pherome concn. indicated that 2.0 mg of pheromone per trap elicited an optimum response. The proportion of marked beetles released in 2.5 m x 0.3 m x 0.4 m trough, filled with wheat and caught by unbaited probe traps, declined with distance from release point, whereas phermone traps captured a similar proportion up to 2.0 m from the traps. Tracks of *T. castaneum* responding to different pheromone concn. in still and moving air in a 2.5 m x 0.4 m olfactometer indicated that the aggregation pheromone stimulated the beetles to walk faster at higher concn., to increase the frequency and magnitude of turning and to decreasetrack reversal distances and distances between turns. The behavioural responses of the beetles to the pheromone in still and moving air were similar, indicating chemotaxis as the major orientation mechanism used by *T. castaneum* to locate an odour source. The beetles showed greater orientation efficiency within a discrete pheromone plume than a diffuse plume. AS

BIOCHEMISTRY AND NUTRITION

1486

Stachowiak (J) and Gawecki (J). **Sorption of copper, molybdenum, and selenium ions on selected dietary fibre preparations.** *Acta Alimentaria Polonica* 15(1): 1989: 107-112

In vitro exp. were performed to determine Cu, Mo, and Se sorption on cellulose, wheat bran, and apple pomace in various temp. and at various pH of the system. The best sorption of Se in solutions with pH 8.23, and of Mo (regardless of the solutions' pH) was on pomace, while Cu was best absorbed on cellulose preparations with pH 5.02 and 8.23. The effect on sorption of temp. and pH of the system was significant and different for the various elements and preparation types. AS

1487

Gawecki (J) and Stachowiak (J). **Stability of copper, molybdenum and selenium ions binding to the surface of dietary fibre preparations in simulated conditions of the human gastrointestinal tract.** *Acta Alimentaria Polonica* 15(1): 1989: 113-118

The release of Cu, Mo, and Se ions previously adsorbed on wheat bran and apple pomace was studied *in vitro* using human digestive enzymes. The highest desorption of copper was by gastric juice from wheat bran and apple pomace, while the largest quantities of Mo were desorbed by duodenal juice from wheat bran. The strongest binding during treatment with both digestive enzymes was found to be that of Se to apple pomace. AS

1488

Anderson (JW), Deakins (DA), Floore (TL), Smith (BM) and Whitis (SE). **Dietary fiber and coronary heart disease.** *CRC Critical Reviews in Food Science and Nutrition* 29(2): 1990: 95-147

The importance and significance of coronary heart disease (CHD), dietary fiber and health, dietary fiber and CHD, prevention and regression of CHD and practical role of fiber in prevention of CHD are discussed in this review. 466 references. BV

1489

Windham (CT), Helm (AA) and Wyse (BW). **Integrity of small databases in computer analysis of dietary data.** *CRC Critical Reviews in Food Science and Nutrition* 29(3): 1990: 149-166

Review. 53 references. SRA

1490

Fogerty (AC). **Dietary fatty acids and blood lipids.** *CSIRO Food Research Quarterly* 49(3/4): 1989: 36-45

A brief outline of recent developments in dietary fat, fatty acids, essential fatty acids, fatty acids in diet, saturated fatty acids and blood lipids, monounsaturated fatty acids and blood lipids, essential fatty acids and blood lipids is given in this article. BV

1491

Skerritt (JH), Devery (JM) and Hill (AS). **Gluten intolerance: Chemistry, celiac-toxicity, and detection of prolamines in foods.** *Cereal Foods World* 35(7): 1990: 638-644

1492

Friedman (M) and Molnar-Perl (I). **Inhibition of browning by sulphur amino acids. I. Heated amino acid-glucose systems.** *Journal of Agricultural and Food Chemistry* 38(8): 1990: 1642-1647

Amino acids interact with carbohydrates to form Maillard browning products. Such reactions reduce the nutritional value of foods containing amino acids and carbohydrates and may lead to the formation of compounds that are mutagenic and clastogenic or chromosome-damaging. A need therefore exists to inhibit these heat-induced interactions. To demonstrate whether SH-containing sulphur amino acids minimize nonenzymatic browning, β-alanine, N $^{\alpha}$-acetyl-L-lysine, glycylglycine, and a mixture of amino acids were each heated with glucose in the absence and presence of the following potential inhibitors: N-acetyl-L-cysteine, L-cysteine, reduced glutathione, sodium bisulphite, and urea. Inhibition was measured as a function of temp., time of heating, and concn. of reactants. The extent of browning was estimated by absorbance measurements at 420 nm. Inhibition was independent of the amino group containing reactant. The min. concn. for optimum inhibition, in moles of inhibitor per mole of D-glucose, were as follows: sodium bisulphite, 0.02; L-cysteine, 0.05; N-acetyl-L-cysteine, 0.2; reduced glutathione, 0.2; urea, 8. An 'index of prevention' (IP) was used to calculate the inhibition at the optimum mole ratio range, where IP = 100 - [molar absorptivity value (MAV) of the amine compound + glucose + inhibitor] x 100/(MAV of the amine compound + glucose). The calculated values were about 90% in all cases. Possible mechanisms of browning prevention are discussed. AS

1493

Molnar-Perl (I) and Friedman (M). **Inhibition of browning by sulphur amino acids. 2. Fruit juices and protein-containing foods.** *Journal of Agricultural and Food Chemistry* 38(8): 1990: 1648-1651

Enzymatic and nonenzymatic browning reactions may adversely affect the quality, nutritional value, and safety of foods. A need therefore exists to develop methods to control such reactions in a variety of foods. Reflectance measurements were used to compare the relative effectiveness of a series of compounds in inhibiting browning in freshly prepared and commercial fruit juices including apple, grape, grapefruit, orange, and pineapple juices. The potential inhibitors tested include ascorbic acid, a commercial formulation called Sporix, sodium sulphite, N-acetyl-L-cysteine, L-cysteine, and reduced glutathione. For comparison, related studies were also carried out with several protein-containing foods such as casein, barley flour, soy flour, nonfat dry milk, and the commercial infant formula Isomil. The results revealed that under certain conditions SH-containing N-acetyl-L-cysteine and the tripeptide reduced glutathione may be as effective as sodium sulphite in preventing both enzymatic and nonenzymatic browning. The unique electronic and nucleophilic properties of sulphydryl compounds that enable them to act as inhibitors of both enzymatic and nonenzymatic browning are discussed. These sulphur amino acids merit further study to assess their potential for preventing long-term food browning under practical storage and processing conditions. AS

1494

Skurray (GR). **Automated analysis of thiamine and riboflavin in food.** *ASEAN Food Journal* 5(3): 1990: 123-124

TOXICOLOGY

1495

Rukmini (C). **Reproductive toxicology and nutritional studies on mahua oil (*Madhuca latifolia*).** *Food and Chemical Toxicology* 28(9): 1990: 601-605

Nutritional studies were carried out in groups of 15 weanling albino rats of each sex, fed for 14 wk on a 20% protein diet, adequate in all vitamins and minerals, containing 10% mahua oil. A similar (control) group was simultaneously maintained on the same basic diet containing 10% groundnut oil. The growth, fat absorption, and retention of N, Ca and P were similar in the 2 groups, as were the lipid profiles of the serum, liver and heart. Multigeneration reproduction studies in groups of 15 rats of each sex, fed a diet containing 10% mahua oil, as used in the above study, indicated poor reproductive performance in the second generation. All the male rats became sterile. Histological studies indicated bilateral testicular atrophy with degenerative changes in the seminiferous tubules in the affected animals. On withdrawal of mahua oil from the diet and rehabilitation, the male animals regained their fertility. These results indicate temporary male sterility on feeding mahua oil to rats. No other adverse toxicological effects were found. BV

1496

Schlatter (J) and Lutz (WK). **The carcinogenic potential of ethyl carbamate (urethane): risk assessment at human dietary exposure levels.** *Food and Chemical Toxicology* 28(3): 1990: 205-211

Review. 48 references. SRA

1497

Poulsen (E). **Relevance of endpoints in toxicity testing of food ingredients.** *Food and Chemical Toxicology* 28(11): 1990: 779-782

1498

van Gelderen (CEM), Savelkoul (TJF) and Sangster (B). **Safety studies in humans. I.Studies on food ingredients.** *Food and Chemical Toxicology* 28(11): 1990: 771-773

1499

Parizek (J). **Health effects of dietary selenium.** *Food and Chemical Toxicology* 28(11): 1990: 763-765

1500

Roberfroid (M). **Toxicological evaluation of dietary fibre.** *Food and Chemical Toxicology* 28(11): 1990: 747-749

1501

Roe (FJC). **Shortcomings of current strategy for toxicity testing of food chemicals.Polyols.** *Food and Chemical Toxicology* 28(11): 1990: 739-742

1502

Conning (DM). **Strategies for toxicity testing of food chemicals and components.** *Food and Chemical Toxicology* 28(11): 1990: 735-738

1503

Scott (PM). **Trichothecenes in grains.** *Cereal Foods World* 35(7): 1990: 665-666

The natural occurrence of non-macrocylic trichothecenes formed by *Fusarium* sp in grains, regulations, methods of analysis, the effects of food processing, and possible decontamination procedures are highlighted in this article. BV

FOOD LAWS AND REGULATIONS

Nil

Acceptability
milk, bacterial counts & acceptability of refrigerated pasteurized 1356
Acetate
meat emulsion system, acetate & properties of lean pork meat containing 1426
Acetic acid
beef surfaces, acetic acid & microorganism control on 1419
Acetylene
mangoes, acetylene & ripening of 1332
Acidification
meat particulates, acidification & Bacillus coagulans spores thermal inactivation in 1414
Additives
fish, additives & quality of mechanically deboned by-catch 1448
Alfalfa
Klebsiella pneumoniae in alfalfa 1300
Alkaline phosphatase test
goat's milk, alkaline phosphatase test for 1361
Aluminium
infant formulas, Al concn. in 1455
pickle brine, Al & decomposition control in turmeric added 1482
tea, Al NMR spectroscopic detn. in 1467
Amino acids
apples/potatoes, browning inhibition by sulphur amino acids in 1324
browning inhibition by sulphur amino acids 1492
Amylases
baked goods, alpha-amylases & staling control of 1342
Antibacterial activity
Lactobacillus sake, antibacterial activity of 1408
Antifungal substances
Lactobacillus acidophilus, environment/nutritional factors & antifungal substance production by 1266
Antimutagens
food, antimutagens in 1277
Antioxidants
food, antioxidants in 1277
toxicity testing of antioxidants, review 1276
Apple juices
characterization of varietal apple juices 1464
polyphenols & pectinolysis during production of apple juices 1463
Apples
browning inhibition by sulphur amino acids in apples 1324
polyphenoloxidase isolation/charaterization from apples 1325
prestorage heat treatment & quality improvement in stored apples 1327
waste, pectin extraction from apple 1326
Aseptic processing
tomato pastes, thermal treatment of aseptically processed 1322
Aspergillus oryzae
whey powder solutions, Asp. oryzae lactase & lactose hydrolysis in 1400
BHA
toxicity testing of BHA, review 1276
BHT
toxicity testing of BHT, review 1276
Bacillus coagulans
meat particulates, acidification/processing & Bacillus coagulans spores thermal inactivation in 1414
Bacteria
coliform bacteria inhibition by lactic culture 1264
milk, bacterial counts & acceptability of refrigerated pasteurized 1356
milk, micropipette/autoloop & bacterial evaluation in raw 1360
oysters, bacteria in post-harvest shell stock 1442
Bacterial quality
cow milk, bacterial quality of 1370
Baker's yeast
frozen doughs, growth condition/trehalose content & baker's yeast cryotolerance of 1340
Bakery
construction design, bakery 1347
Bakery products
enzymes & staling control of baked goods 1342
Bananas
peel slurry, volatile fatty acid production from banana 1328
postharvest technology of ASEAN banana 1323
Beans
phytic acid hydrolysis in stored beans 1295
Beef
hot water & Escherichia coli destruction in beef 1415
meat protein conc., beef tissue waste preparation of 1417
phosphate & functional properties of buffalo meat 1418
surfaces, acetic acid & microorganism control on beef 1419
Beef patties
phosphate & palatability of beef patties 1418
Beverages
enantiomeric separation in beverage analysis 1259
processing & polyethylene terephthalate migration into bottled beverages 1457
Bifidobacteria
dairy products, bifidiobacteria use in fermented 1374
Biochemical changes
Cheddar cheese, ripening & biochemical changes in buffalo milk based 1386
Biochemistry
snail meat, biochemical parameters in 1443
Biological quality
hazelnut flour, biological quality of defatted 1309
Biomass
pH & production of Leuconostoc oenos biomass 1267
Biotechnology
analytical techniques in biotechnology 1273
Biotin
yoghurt products, biotin content of 1402
Biscuits
protein enrichment of biscuits 1346
Bitterness
food products, bitterness reduction/inhibition in 1255
Black king fish

temp. & preservation of ready-to-cook black king fish 1447
Blackgram
lipoprotein metabolism in rats & blackgram fibre 1296
Botrytis
food, Botrytis ELISA detection in 1265
Breadmaking
gluten quality testing for breadmaking 1348
wheat, breadmaking properties of UP hill 1286
Broilers
growth/carcass yield/conformation traits of broilers 1431
Browning
amino acids, browning inhibition by sulphur 1492
apples/potatoes, browning inhibition by sulphur amino acids in 1324
fruit juices, browning inhibition by sulphur amino acids in 1493
pear juices/concentrates, controlled atm. storage & browning of 1466
plantain pulp, enzymic browning in ripening 1313
Buffaloes
meat, phosphate & functional properties of buffalo 1418
skeletal muscles, temp. & physico-chem. changes in stored buffalo 1416
Butter
churning parameters of continuous butter making machine 1378
Buttermilk
paneer manufacture, sour buttermilk for 1399
Cadmium
infant formulas/cow milk, Cd levels in 1454
Calcium caseinates
properties of buffalo milk based edible calcium caseinates 1403
Calcium chloride
cowpeas, calcium chloride & pectin loss/texture of cooked 1297
Camel milk products
ice-cream from camel milk products 1394
Candy
wax gourd candy, high fructose syrup & production of 1334
Canning
humitas based on opaque-2 corn complemented with sweet lupins, canning of 1305
Carbohydrates
coconuts, roasting & carbohydrate changes in 1308
Carcasses
broilers, carcass yield of 1431
rabbit, carcass characteristics of spent 1428
Carcinogenicity
ethyl carbamate, carcinogenic potential of 1496
Cargo
refrigerated freight containers, thermocouples & cargo temp. monitoring in 1252
Carotenoids
soybean oils, carotenoids & chlorophyll-sensitized photooxidation of 1479
Caseins
histopathological results of rats fed semi-purified diets containing caseins 1404
skim milk powder, coagulation/washing conditions & acid casein production from 1398
Cashewnuts
enzyme/enzyme inhibitors in cashewnuts 1480
Cassava
mechanical chipping, energy requirement in cassava 1314
Cattle
meat identification, adrenal/immunoglobin G antigen for cooked cattle 1406
Charoli
enzyme/enzyme inhibitors in charoli 1480
Cheddar cheese
Lactobacillus strain producing white crystals on Cheddar cheese 1385
bacterial enzymes & accelerated ripening of Cheddar cheese 1387
manufacture, coagulum firmness/yield in Cheddar cheese 1383
maturation & flavour/chem. parameters of Cheddar cheese 1384
ripening & biochemical changes in buffalo milk based Cheddar cheese 1386
Cheese
glycolysis during manufacture/ripening of cheese 1382
nitrites & properties of cheese 1380
radioactive isotopes transfer from cow milk to cheese 1379
technology, low-fat cheese 1381
Chickens
kababs, refrigerated storage & quality of pre-cooked chicken 1429
sausages, preparation/storage & microbial quality of chicken 1440
Children
legume consumption in preschool children 1294
Chilling
cucumbers, chilling temp. & physiological response of warmed 1317
quail meat, polyphosphate chilling & quality of frozen 1436
sardines, chilling method & quality of white 1450
Chipping
cassava mechanical chipping, energy requirement in 1314
Chlorophylls
soybean oils, carotenoids & chlorophyll-sensitized photooxidation of 1479
Chocolates
crumb 1337 1338
Cholesterol
rice bran, cholesterol & effect of 1282
Churning
butter making machine, churning parameters of continuous 1378
Citrates
meat emulsion system, citrate & properties of lean pork meat containing 1426
Citrus juices
review 1462
Clams
processing & meat quality of clams 1260
Coagulation
skim milk powder, coagulation acid casein production from 1398
Coating
durian fruit, surface coating & wt. loss/internal atm. of 1330
Cockles
keeping quality of chilled/frozen cockles 1432
Cocoa butter
kokum butter TLC detection in cocoa butter 1307
Coconut proteins
coconuts, roasting & protein changes in 1308
Coconuts

roasting & carbohydrate/protein changes in coconuts 1308
Coffee
hydrogen peroxide analysis in freshly prepared coffee 1460
nitrosourea-mediated DNA damage in mice, coffee & inhibition of 1459
Coffee powder
formulation of ready-to-reconstitute coffee complete powder 1461
Coliforms
lactic cultures & inhibition of coliform bacteria 1264
milk/milk products, coliforms detection in 1363
Colour
beta-carotene-wheat flour mixes, extrusion cooking & colour loss in 1288
soybean oils, green colour in processed 1475
Computers
dietary data, databases & computer analysis of 1489
dough quality analysis, computer system for 1284
Confectionery
industry, quality control in sugar confectionery 1336
Consistency
tomato products, fruit anatomy/solids comp. & consistency of 1321
Containers
refrigerated freight containers, thermocouples & cargo temp. monitoring in 1252
Cookers
evaluation of low temp. meat cooker 1413
Cookies
protein enrichment of cookies 1346
Cooking
foods, conventional cooking & polyethylene terephthalate migration into packed 1457
locust beans, cooking method & water absorption of African 1298
meat cooker, cooking time & low temp. 1413
Copper
cow milk/infant formulas, Cu levels in 1454
dietary fiber preparations, Cu ions sorption on 1486
dietary fiber preparations, Cu ions stability in 1487
Corn
canning of humitas based on opaque-2 corn complemented with sweet lupins 1305
phosphates & mold growth/mycotoxin production in high moisture corn 1291
shelled maize, desorption isotherms of 1290
Corn oils
sterol/fatty acid comp. in corn germ oils 1476
Cottage cheese
lactic cultures evaluation of cow/buffalo milk based cottage cheese 1388
processing of buffalo milk based cottage cheese 1390
yoghurt culture performance in cottage cheese 1389
Cowpeas
salts & pectin loss/texture of cooked cowpeas 1297
Cucumbers
chilling temp. & physiological response of warmed cucumbers 1317
Culture media
water activity of culture media 1262
Cultured milk
pathogenic microorganisms during production/storage of cultured milk 1377
Curing
meat proteins, chorizo curing process & emulsifying properties of 1410
Cyanides
sorghum sprouts, germination/drying & cyanide content of 1293
Dairy
microwaves in dairy processing 1350
Dairy products
bifidobacteria use in fermented dairy products 1374
energy analysis in Indian dairy products processing 1376
Deacidification
fats/oils, steaming & deacidification of 1468
Dehuller
soybeans, low-cost manual dehuller for 1312
Dehulling
locust beans, dehulling of African 1298
Deodourization
fats/oils, steaming & deodourization of 1468
Dhals
fried 1280
Dietary data
databases & computer analysis of dietary data 1489
Dietary fibers
coronary heart disease & dietary fiber 1488
preparations, Cu/Mo/Se ions sorption on dietary fiber 1486
preparations, Cu/Mo/Se ions stability in dietary fiber 1487
toxicological evaluation of dietary fibres 1500
Diseases
dietary fiber & coronary heart disease 1488
Dough
frozen doughs, growth condition/trehalose content & baker's yeast cryotolerance of 1340
quality analysis, computer system for dough 1284
sweet dough, invertase activity & yeast leavening ability in 1341
wheat flour doughs, formation/properties of 1287
Drab jew fish
temp. & preservation of ready-to-cook drab jew fish 1447
Dried foods
fish products, histamine content of Kakinada coast dried 1452
oxidation measurement in pufa rich dried foods 1352
Drying
adsorption freeze-drying 1253
sorghum sprouts, drying & cyanide content of 1293
wheat, drying & proteins of germinating 1285
yellowtail, drying of 1451
Duck meat
age/sex & qualitative/quantitative characteristics of duck meat 1433
Durian
shelf-life extension of fresh durian 1331
surface coating & wt. loss/internal atm. of durian fruit 1330
ELISA
food, Botrytis/Monascus ELISA detection in 1265
Egg products
hard cooked egg products 1437
Eggs

abnormalities in poultry eggs 1438
shell eggs, gamma-irradiation & quality of 1439
Electrophoresis
sweet lupin proteins, electrophoretic separation of 1304
Emulsifying properties
meat proteins, chorizo curing process & emulsifying properties of 1410
Enantiomeric separation
food/beverage analysis, enantiomeric separation in 1259
Endopolygalacturonase
Kluyveromyces marxianus, electrophoretic analysis of endopolygalacturonase produced by 1272
Energy
cassava mechanical chipping, energy requirement in 1314
dairy products processing, energy analysis in Indian 1376
freeze-drying, energy requirement in 1253
meat cooker, energy consumption of low temp. 1413
Enzymes
Cheddar cheese, bacterial enzymes & accelerated ripening of 1387
charoli/cashewnuts, enzyme/enzyme inhibitors in 1480
lactose, processing parameters for enzymic hydrolysis of 1351
plantain pulp, enzymic browning in ripening 1313
Equipments
butter making machine, churning parameters of continuous 1378
processing equipments 1254
Escherichia coli
beef surfaces, acetic acid & E. coli control on 1419
cultured milk, E. coli during production/storage of 1377
ethyl alcohol production, recombinant E. coli & glucose/lactose/xylose for 1263
milk products, coliforms in indigenous 1375
Ethyl alcohol
recombinant E. coli & glucose/lactose/xylose for ethyl alcohol production 1263
wines, ethyl alcohol GC evaluation in 1458
Ethyl carbamates
carcinogenic potential of ethyl carbamate 1496
Extraction
apple waste, pectin extraction from 1326
solvent extraction industries 1469
sweet lupin proteins, extraction of 1303
techniques, carrousel extractor in modern extraction 1473
Extractors
carrousel extractor in modern extraction techniques 1473
Extrusion cooking
beta-carotene-wheat flour mixes, extrusion cooking & colour loss in 1288
Fats
cheese technology, low-fat 1381
goat meat balls, fat source/level evaluation in 1422
khoa, processing conditions & free fat content in 1395
preservatives detn. in fat-rich foods 1278
steaming & deodourization/deacidification of fats 1468
substitutes, safety evaluation of fat 1471
Fats animal
fatty acid comp. of animal fats 1405
Fats milk
edible oil crisis & production of milk fat 1365
Fatty acids
Teleme cheese, fatty acid fortified milk & lactic acid production by 1393
animal fats, fatty acid comp. of 1405
banana peel slurry, volatile fatty acid production from 1328
corn germ oils, fatty acid comp. in 1476
dietary fatty acids & blood lipids 1490
Fermented foods
dairy products, bifidiobacteria use in fermented 1374
Fibreboard
corrugated fibre board, kraft paper quality & physical properties of 1249
Fish
Salmonella distribution in Kochi market fresh/frozen fish 1446
frozen fish, quality changes in retail cold stored 1445
organochlorine insecticide residues in Mahala water fish 1444
washing/additives/storage temp. & quality of mechanically deboned by-catch fish 1448
Fish products
dried fish products, histamine content of Kakinada coast 1452
Flavour
Cheddar cheese, maturation & flavour of 1384
Mozzarella cheese, heat & flavour of buffalo milk based 1392
meat flavour 1411
milk, pasteurization/storage & flavour quality of aseptically packaged 1355
sardines, chilling method & flavour of white 1450
Folates
yoghurt products, folate content of 1402
Freeze-drying
adsorption freeze-drying 1253
Frozen foods
cockles, keeping quality of frozen 1432
quail meat, polyphosphate chilling & quality of frozen 1436
vegetables, temp. & microbial quality detn. in frozen 1316
Fructose syrup
wax gourd candy, high fructose syrup & production of 1334
Fruit juices
browning inhibition by sulphur amino acids in fruit juices 1493
review 1462
Fungi
corn, phosphates & mold growth/mycotoxin production in high moisture 1291
Galactosidases
Pediococcus, beta-galactosidase of 1269
Gas chromatography
wines, ethyl alcohol/glycerine GC evaluation in 1458
Gelation
UHT milk, lactose hydrolysis/inactivation treatment of age gelation of 1353
Germination
sorghum sprouts, germination & cyanide content of 1293
Glucose
ethyl alcohol production, recombinant E. coli & glucose for 1263
Glucose syrup

confectionery, glucose syrups for 1335
Glucosinolates
rapeseeds, glucosinolate content detn. X-RF method in 1310
Gluten
breadmaking, gluten quality testing for 1348
foods, gluten detn. monoclonal antibody sandwich enzyme immunoassays in 1281
intolerence 1491
wheat glutens, mixograph & evaluation of 1289
Glycerine
wines, glycerine GC evaluation in 1458
Glycolysis
cheese, glycolysis during manufacture/ripening of 1382
Goat
bone marrow, lipid comp. of goat 1421
Goat meat balls
fat source/level evaluation in goat meat balls 1422
Goat meat patties
texturized soy proteins & physico-chem./sensory properties of goat meat patties 1423
Goat milk
alkaline phosphatase test for goat's milk 1361
ribonuclease from goat milk 1368
Guava juice concentrate
production of partially clarified guava juice concentrate 1465
Guava juices
production of partially clarified guava juices 1465
HPLC
food analysis on silica-bound HPLC phases 1257
Hazard
meat/pasta product, hazard analysis & microbial safety of processed 1412
Hazelnut flour
chem. comp./biological quality of defatted hazelnut flour 1309
Heat
Mozzarella cheese, heat & quality of buffalo milk based 1392
beef, hot water & Escherichia coli destruction on 1415
milk, preheat treatment/butter milk addition & heat stability of recombined evaporated/reconstituted concentrated 1359
pickle brine, Al & decomposition control in turmeric added 1482
Heating
APV ohmic heating process, validation of 1251
palm oil fractions, hot water for heating 1478
Histamines
fish products, histamine content of Kakinada coast dried 1452
Horticultural porducts
postharvest technology & marketing of horticultural produce 1245
Hydrogen peroxide
coffee, hydrogen peroxide analysis in freshly prepared 1460
Hydrogen sulphide
buffalo sterilized milk, hydrogen sulphide contents during manufacture of 1369
Hydrolysis
UHT whole milk, lactose hydrolysis/inactivation treatment of age gelation of 1353
beans, phytic acid hydrolysis in stored 1295
lactose, processing parameters for enzymic hydrolysis of 1351
whey powder solutions, Asp. oryzae lactase & lactose hydrolysis in 1400
Ice-cream
camel milk products, ice-cream from 1394
Immunoassays
food industries, immunoassays application in 1261
foods, gluten detn. monoclonal antibody sandwich enzyme immunoassays in 1281
Industries
food industries, immunoassays application in 1261
solvent extraction industries 1469
Infant foods
Al concn. in infant formulas 1455
Zn/Cd/Pb/Cu levels in infant formulas 1454
development/chem./nutritional evaluation of sweet lupin/wheat/milk based infant foods 1453
maltodextrin & physico-chem. characteristics of spray dried infant foods 1456
Insecticides
controlled-release insecticides for stored-grain pest control, Indonesia 1483
Insects
stored product insects responses to pheromones 1484
Instant milk
Salmonella recovery from instant nonfat dry milk 1372
Invertases
sweet dough, invertase activity & yeast leavening ability of 1341
Irradiation
eggs, gamma-irradiation & quality of shell 1439
food 1247
Kababs
refrigerated storage & quality of pre-cooked kababs 1429
Keeping quality
cockles, keeping quality of chilled/frozen 1432
durian, shelf-life extension of fresh 1331
milk, heat treatment & keeping quality of stored 1357
Khoa
coliforms in khoa 1375
comp. & Instron texture profile of khoa 1397
humidity-moisture sorption relationship of khoa 1396
processing conditions & free fat content in khoa 1395
Klebsiella pneumoniae
alfalfa/mung bean sprouts, Klebsiella pneumoniae in 1300
Kluyveromyces marxianus
electrophoretic analysis of endopolygalacturonase produced by K. marxianus 1272
Kokum butter
cocoa butter, kokum butter TLC detection in 1307
Lactase
whey powder solutions, Asp. oryzae lactase & lactose hydrolysis in 1400
Lactate
meat emulsion system, lactate & properties of lean pork meat containing 1426
Lactobacillus
Cheddar cheese, Lactobacillus strain producing white crystals on 1385
Lactobacillus acidophilus
Mg/Mn ions & growth of L. acidophilus 1371
environment/nutritional factors & antifungal substance production by Lactobacillus acidophilus 1266
Lactobacillus bulgaricus

cultured milk, L. bulgaricus during production/storage of 1377
Lactobacillus sake
antibacterial activity of Lactobacillus sake 1408
Lactones
milk/milk products, lactones in, review 1366 1367
Lactose
UHT whole milk, lactose hydrolysis & gelation of 1353
ethyl alcohol production, recombinant E. coli & lactose for 1263
processing parameters for enzymic hydrolysis of lactose 1351
whey powder solutions, Asp. oryzae lactase & lactose hydrolysis in 1400
Lead
cow milk/infant formulas, Pb levels in 1454
Legumes
children, legume consumption in preschool 1294
Lemons
seal packaging & prolonged storage of lemons 1329
Leuconostoc oenos
biomass, pH & production of Leuconostoc oenos 1267
Light
pickle brine, Al & decomposition control in turmeric added 1482
Lipids
blood lipids & dietary fatty acids 1490
goat bone marrow, lipid comp. of 1421
Lipoproteins
blackgram fibre & lipoprotein metabolism in rats 1296
Listeria monocytogenes
sodium hypochlorite/quarternary ammonium sanitizers & destruction of L. monocytogenes 1268
Locust beans
African locust beans, cooking method/dehulling & water absorption of 1298
Mackerels
temp. & preservation of ready-to-cook mackerels 1447
Magnesium
Lactobacillus acidophilus, Mg ions & growth of 1371
Magnesium chloride
cowpeas, magnesium chloride & pectin loss/texture of cooked 1297
Mahua oils
reproductive toxicology/nutritional studies on mahua oils 1495
Maltodextrins
infant foods, maltodextrin & physico-chem. characteristics of spray dried 1456
Manganese
Lactobacillus acidophilus, mn ions & growth of 1371
Mangoes
acetylene & ripening of mangoes 1332
low-temp. storage & ripening of mangoes 1333
Marination
mutton, marination & quality of 1420
Marketing
horticultural produce, postharvest technology & marketing of 1245
Meat
cooker, evaluation of low temp. meat 1413
minced meats, storage atm. & microbial/physicochemical changes in 1427
particulates, acidification/processing & Bacillus coagulans spores thermal inactivation in meat 1414
processed meat, hazard analysis & microbial safety of sous vide 1412
Yersinia enterocolitica recovery from meat 1407
Meat emulsions
chem. additives & structure of meat emulsions 1409
polyphosphate/citrate/acetate/ /lactate & properties of lean pork meat containing meat emulsion system 1426
Meat products
Salmonella detection semisolid Rappaport medium evaluation in meat products 1430
Yersinia enterocolitica recovery from meat products 1407
Meat proteins
chorizo curing process & emulsifying properties of meat proteins 1410
conc., beef tissue waste & preparation of meat protein 1417
pork meat & properties of meat proteins 1425
Metabolism
blackgram fibre & lipoprotein metabolism in rats 1296
Microbial quality
chicken sausages, preparation/storage & microbial quality of 1440
fish, microbial quality of retail cold stored frozen 1445
kababs, refrigerated storage & microbial quality of 1429
meats, storage atm. & microbial quality in 1427
milk, heat treatment & microbial quality of stored 1357
milk, pasteurization/storage & microbial quality of 1354
sardines, chilling method & microbial quality of white 1450
sardines, quality changes in chilled sea water stored Indian oil 1449
vegetables, temp. & microbial quality detn. in frozen 1316
Microorganisms
meat/pasta products, hazard analysis & microbial safety of processed 1412
Microwaves
dairy processing, microwaves in 1350
foods, microwave cooking & polyethylene terephthalate migration into packed 1457
packaging materials for microwave foods 1248
starch & microwave cooking 1339
Milk
Zn/Cd/Pb/Cu levels in cow milk/infant formulas 1454
aseptically packaged milk, pasteurization/storage & quality of 1354
buffalo milk, ribonuclease from 1368
buffalo sterilized milk, hydrogen sulphide contents during manufacture of 1369
cheese, radioactive isotopes transfer from cow milk to 1379
chem. comp. detn. of bulk milk 1362
coliform detection in processed milk 1363
cow milk, bacterial quality of 1370
heat treatment & microbial/keeping quality of stored milk 1357
infant foods,

development/chem./nutritional evaluation of sweet lupin/wheat/milk based 1453
lactones in milk, review 1366, 1367
micropipette/autoloop & bacterial evaluation in raw milk 1360
pasteurization/storage & shelf-life/sensory quality of aseptically packaged milk 1355
preheat treatment/buttermilk addition & heat stability of recombined evaporated/reconstituted cencentrated milk 1359
proteolysis of alcohol-precipitated whey protein supplemented milk 1401
refrigerated pasteurized milk, bacterial counts & acceptability of 1356

Milk fish
temp. & preservation of ready-to-cook milk fish 1447

Milk products
camel milk products, ice-cream from 1394
coliform detection in milk products 1363
coliforms in indigenous milk products 1375
fermented milk products, Staphylococcal isolates in 1373
lactones in milk products, review 1366 1367

Milling
wheat cvs, milling characteristics of 1283

Mixogram
mixogram parameters evaluation by electronic torque sensing 1345

Mixograph
wheat glutens, mixograph & evaluation of 1289

Mixography
mixography standardization/digital data aquisition 1344

Molybdenum
dietary fiber preparations, Mo ions sorption on 1486
dietary fiber preparations, Mo ions stability in 1487

Monascus
food, Monascus ELISA detection in 1265

Mozzarella cheese
heat & quality of buffalo milk based Mozzarella cheese 1392
quality of buffalo milk direct acid Mozzarella cheese 1391

Mullets
frozen mullet, quality of retail cold stored 1445
temp. & preservation of ready-to-cook mullets 1447

Mung beans
sprouts, Klebsiella pneumoniae in mung beans 1300
vermicelli, small-scale processing of mungbean 1299

Muscles
buffalo skeletal muscles, temp. & physico-chem. changes in stored 1416
exercise & muscle growth 1244
proteins, post-mortem conditioning treatments & electrophoretic patterns of sheep muscle 1424

Mushrooms
Pleurotus citrinopileatus, protein quality of 1319

Mutton
kababs, refrigerated storage & quality of pre-cooked mutton 1429
marination & quality of mutton 1420

Mycotoxins
corn, phosphates & mycotoxin production in high moisture 1291

NMR spectroscopy
tea, aluminium NMR spectroscopic detn. in 1467

Nitrates
dry foodstuffs, nitrates spectrophotometric detn. in 1256

Nitrites
cheese, nitrities & properties of 1380
dry foodstuffs, nitrites spectrophotometric detn. in 1256

Nutrition
mahua oils, nutritional studies on 1495

Nutritional evaluation
infant foods, nutritional evaluation of sweet lupin/wheat/milk based 1453

Nutritional values
sunflower seed oils, nutritional values of high oleic 1481

Oils
edible oil crisis & production of milk fat 1365
hydrogenated oils, safety evaluation of 1474
potential & production of solvent extracted oils 1470
steaming & deodourization/deacidification of oils 1468
sterols of compositae seed oils 1271

Oilseeds
oil crops production potential & research priorities in India 1306

Okra
controlled atm. storage & chem. changes in okra 1318

Oligosaccharides
pigeon peas/pigeon pea tempe, oligosaccharide levels in 1302

Olive oils
autooxidation & stability of olive oils 1477

Organochlorine insecticides
fish, organochlorine insecticide residues in Mahala water 1444

Oxidation
Kababs, refrigerated storage & oxidation in pre-cooked 1429
dried foods, oxidation measurement in pufa rich 1352
olive oils, autoxidation & stability of 1477

Oysters
shell stock oysters, bacteria/Vibro in post-harvest 1442

Packaging
citrus juices, review 1462
lemons, seal packaging & prolonged storage of 1329

Packaging materials
microwave foods, packaging material for 1248
volatiles in packaging materials 1250

Palm oils
fractions, hot water for heating palm oil 1478

Paneer
coliforms in paneer 1375
manufacture, sour buttermilk for paneer 1399

Pantothenic acid
yoghurt products, pantothenic acid content of 1402

Papayas
postharvest technology of ASEAN papayas 1323

Paper
corrugated fibreboard, kraft paper quality & physical properties of 1249

Pasta
product, hazard analysis & microbial safety of pasta 1412

Pasteurization

__ milk, pasteurization & quality of a aseptically packaged 1354
milk, pasteurization & shelf-life/sensory quality of aseptically packaged 1355
Patties
goat meat patties, texturized soy proteins & physico-chem./sensory properties of 1423
Pear juice concentrates
controlled atm. storage & browning of d'Anjou pear juice conc. 1466
Pear juices
controlled atm. storage & browning of d'Anjou pear juices 1466
Pearl spot
frozen pearl spot, quality changes in retail cold stored 1445
Pectin
apple waste, pectin extraction from 1326
cowpeas, salts & pectin loss of cooked 1297
Pectinolysis
apple juices, polyphenols & pectinolysis during production of 1463
Pediococcus
beta-galactosidase of Pediococcus 1269
Peeling
tomatoes, fruit anatomy & peeling of 1320
Peroxidases
pickle brine, Al & decomposition control in turmeric added 1482
Pests
controlled-release insecticides for stored-grain pest control, Indonesia 1483
Pheromones
Tribolium castaneum, pheromone & responses of 1485
stored product insects responses to pheromones 1484
Phosphates
buffalo meat/patties, phosphates & functional properties of 1418
corn, phosphates & mold growth/mycotoxin production in high moisture 1291
Physical properties
wheat, physical properties of UP hill 1286
Physiology
cucumbers, chilling temp. & physiological response of warmed 1317
Phytic acid
beans, phytic acid hydrolysis in stored 1295
Pickles
Al & decomposition control in turmeric added pickle brine 1482
Pigeon meat
comp. of pigeon meat 1434
Pigeon meat proteins
proteins of pigeon meat 1434
Pigeon peas
oligosaccharide levels in pigeon peas 1302
tempe, oligosaccharide levels in pigeon pea 1302
Plant cell cultures
food applications of plant cell cultures 1275
Plantain
pulp, enzymic brownig in ripening plantain 1313
Polyethylene terephthalate
foods, processing & polyethylene terepthalate migration into packed 1457
Polyols
toxicity testing of polyols 1501
Polyphenoloxidases
apples, polyphenoloxidase isolation/characterization from 1325
Polyphenols
apple juices, polyphenols & pectinolysis during production of 1463
Polyphosphates
meat emulsions, polyphosphates & structure of 1409
meat emulsion system, polyphosphate & properties of lean pork meat containing 1426
quail meat, polyphosphate chilling & quality of rozen 1436
Pork
meat proteins, pork meat & properties of 1425
Potatoes
browning inhibition by sulphur amino acids in potatoes 1324
solanine toxicity evaluation in potatoes 1315
Poultry
meat cooker, evaluation of low temp. poultry 1413
Preservation
food irradiation 1247
Preservatives
fat-rich foods, preservatives detn. in 1278
Processing
cottage cheese, processing of buffalo milk based 1390
lactose, processing parameters for enzymic hydrolysis of 1351
Prolamines
foods, prolamines detection in 1491
Promfret
frozen promfret, quality changes in retail cold stored 1445
Proteases
Pseudomonas fluorescens proteases, monoclonal antibodies reactive to 1364
Proteins
biscuits/cookies, protein enrichment of 1346
mushrooms, protein quality of 1319
Proteolysis
milk, proteolysis of alcohol-precipitated whey protein supplemented 1401
Pseudomonas fluorescens
proteases, monoclonal antibodies reactive to Pseudomonas fluorescens 1364
Quail
meat, age/sex & sensory properties of Japanese quail 1435
meat, polyphosphate chilling & quality of frozen quail 1436
Quality
Mozzarella cheese, heat & quality of buffalo milk based 1392
Mozzarella cheese, quality of buffalo milk direct acid 1391
apples, prestorage heat treatment & quality improvement in stored 1327
clams, processing & meat quality of 1260
milk, pasteurization/storage & quality of aseptically packaged 1354
rabbit meat, quality of spent 1428
sardines, quality changes in chilled sea water stored Indian oil 1449
Quality control
sugar confectionery industry, quality control in 1336
Rabbit meat
carcass characteristics/meat quality of spent rabbit 1428
Rapeseeds
glucosinolate content detn. X-RF method in rapeseeds 1310
Rasgolla

analogue preparation, technology for soy milk based rasogolla 1441
Refrigerated foods
manufacturing practices for refrigerated foods 1246
Residues
organochlorine insecticide residues in Mahala water fish 1444
Rheological properties
wheat, rheological properties of UP hill 1286
Rhyzopertha dominica
pheromones & responses of stored product R. dominica 1484
Riboflavin
food, riboflavin analysis in 1494
Ribonuclease
milk, ribonuclease from buffalo/goat 1368
Rice bran
properties of rice bran 1282
Ripening
Cheddar cheese, bacterial enzymes & accelerated ripening of 1387
Cheddar cheese, ripening & biochemical changes in buffalo milk based 1386
cheese, glycolysis during ripening of 1382
mangoes, acetylene & ripening of 1332
plantain pulp, enzymic browning in ripening 1313
Roasting
coconuts, roasting & carbohydrate/protein changes in 1308
Safety
fat substitutes, safety evaluation of 1471
food ingredients, safety studies on 1498
oils, safety evaluation of hydrogenated 1474
Salmonella
fish, Salmonella distribution in Kochi market fresh/frozen 1446
meat products, Salmonella detection semisolid Rappaport medium evaluation in 1430
milk, Salmonella recovery from instant nonfat dry 1372
Salmonella typhimurium
beef surfaces, acetic acid & S. typhimurium control on 1419
Salting
yellowtail, salting of 1451
Sardines
quality changes in chilled sea water stored Indian oil sardines 1449
temp. & preservation of ready-to-cook Indian oil sardines 1447
white sardines, chilling method & quality of 1450
Sausages
chicken sausages, preparation/storage & microbial quality of 1440
Seer fish
frozen seer fish, quality changes in retail cold stored 1445
Selenium
dietary fiber preparations, Se ions sorption on 1486
dietary fiber preparations, Se ions stability in 1487
health effects of dietary selenium 1499
Sensory properties
apple juices, sensory properties of varietal 1464
duck meat, age/sex & sensory properties of 1433
eggs, gamma-irradiation & sensory properties of shell 1439
fish, sensory properties of retail cold stored frozen 1445
goat meat patties, texturized soy proteins & sensory properties of 1423
kababs, refrigerated storage & sensory properties of pre-cooked 1429
mutton, marination & sensory properties of 1420
quail meat, age/sex & sensory properties of Japanese 1435
quail meat, polyphosphate chilling & quality of frozen 1436
sardines, chilling method & sensory properties of white 1450
sardines, quality changes in chilled sea water stored Indian oil 1449
Sensory quality
milk, pasteurization/storage & sensory quality of aseptically packaged 1355
Shark
yellow dog shark, temp. & preservation of ready-to-cook 1447
Sheep
meat identification, adrenal/immunoglobin G antigen for cooked sheep 1406
muscle proteins, post-mortem conditioning treatments & electrophoretic patterns of sheep 1424
Shelf-life
fish, shelf-life of retail cold stored frozen 1445
Shigella flexneri
NaCl/pH/temp. & growth of Shigella flexneri 1270
Skim milk powder
coagulation/washing conditions & acid casein production from skim milk powder 1398
Snacks
grain based snacks 1280
starch & extruded snack foods 1279
Snail meat
biochemical parameters in snail meat 1443
Sodium bicarbonate
cowpeas, sodium bicarbonate & pectin loss/texture of cooked 1297
Sodium caseinates
properties of buffalo milk based edible sodium caseinates 1403
Sodium chloride
Shigella flexineri, NaCl & growth of 1270
Sodium hexametaphosphate
milk, sodium hexametaphosphate & technology of UHT recombined 1358
Sodium hypochlorite
Listeria monocytogenes, sodium hypochlorite & destruction of 1268
Solanine
potatoes, solanine toxicity evaluation in 1315
Solvent extraction
industries 1469
oils, potential & production of solvent extracted 1470
Sorghum
sprouts, germination/drying & cyanide content of sorghum 1293
vermicelli, sorghum-soy flour based 1349
Soy flour
vermicelli, sorghum-soy flour based 1349
Soy milk
rasgolla analogue preparation, technolgy for soy milk based 1441
Soy proteins
goat meat patties, texturized soy proteins & physico-chem./sensory properties of 1423
histopathological results of rats fed semi-purified diets

containing soy proteins 1404
Soybean oils
carotenoids & chlorophyll-sensitized photooxidation of soybean oils 1479
green colour in processed soybean oils 1475
thermo-oxidative decomposition of soybean oils 1472
Soybeans
Indian economy, soybeans in 1311
low-cost manual dehuller for soybeans 1312
Spectroscopy
tea, aluminium NMR spectroscopic detn. in 1467
Stability
dietary fiber preparations, Cu/Mo/Se ions stability in 1487
milk, preheat treatment/buttermilk addition & heat stability of recombined evaporated/reconstituted concentrated 1359
olive oils, autooxidation & stability of 1477
sunflower seed oils, nutritional/stability characteristics of high oleic 1481
Stabilization
rice bran, stabilization of 1282
Staling
baked goods, enzymes & staling control of 1342
Staphylococcus
milk products, Staphylococcal isolates in fermented 1373
Staphylococcus aureus
cultured milk, Staph. aureus during production/storage of 1377
Starch
microwave cooking & starch 1339
snack foods, starch & extruded 1279
Steaming
fats/oils, steaming & deodourization/deacidification of 1468
Sterols
corn germ oils, sterols in 1476
oils, sterols of compositae seed 1271
Storage
apples, prestorage heat treatment & quality improvement in stored 1327
beans, phytic acid hydrolysis in stored 1295
buffalo skeletal muscles, temp. & physico-chem. changes in stored 1416
citrus juices, review 1462
controlled-release insecticides for stored-grain pest control, Indonesia 1483
cultured milk, pathogenic microorganisms during production/storage of 1377
fish, storage temp. & quality of mechanically deboned by-catch 1448
lemons, seal packaging & prolonged storage of 1329
mangoes, low-temp. storage & ripening of 1333
meats, storage atm. & microbial/physicochemical changes in minced 1427
milk, heat treatment & microbial/keeping quality of stored 1357
milk, storage & quality of aseptically packaged 1354
milk, storage & shelf-life/sensory quality of aseptically packaged 1355
sardines, quality changes in chilled sea water stored Indian oil 1449
Storage cold
kababs, refrigerated storage & quality of pre-cooked 1429
Storage controlled atmosphere
okra, controlled atm. storage & chem. changes in 1318
pear juices/pear juice concentrates, controlled atm. storage & browning of 1466
Sugar
confectionery industry, quality control in 1336
Sunflower oils
nutritional/stability characteristics of high oleic sunflower seed oils 1481
thermo-oxidative decomposition of sunflower oils 1472
Sweet lupin proteins
electrophoretic separation of sweet lupin proteins 1304
extraction/filtration of sweet lupin proteins 1303
Sweet lupins
canning & nutritional quality of humitas based on opaque-2 corn complemented with sweet lupins 1305
infant foods, development/chem./nutritional evaluation of sweet lupin/wheat/milk based 1453
Tastes
sardines, chilling method & tastes of white 1450
Tea
aluminium NMR spectroscopic detn. in tea 1467
Technology
banana/papaya, post harvest technology of ASEAN 1323
horticultural produce, postharvest technology & marketing of 1245
rasogolla analogue preparation, technology for soy milk based 1441
Teleme cheese
fatty acid fortified milk & lactic acid production by Teleme cheese 1393
Tempe
pigeon pea tempe, oligosaccharide levels in 1302
Tenderness
quail meat, age/sex & tenderness of Japanese 1435
Texture
Mozzarella cheese, heat & texture of buffalo milk based 1392
cowpeas, salts & texture of cooked 1297
khoa, comp. & Instron texture profile of 1397
sardines, chilling method & texture of white 1450
Thermal processing
meat particulates, acidification/processing & Bacillus coagulans spores thermal inactivation in 1414
tomato pastes, thermal treatment of aseptically processed 1322
Thiamine
food, thiamine analysis in 1494
Thin layer chromatography
cocoa butter, kokum butter TLC detection in 1307
Tomato pastes
thermal treatment of aseptically processed tomato pastes 1322
Tomato products
fruit anatomy/solids comp. & consistency of tomato products 1321
Tomatoes
fruit anatomy & peeling of tomatoes 1320
Toxicity

antioxidants, toxicity testing of, review 1276
dietary fibres, toxicological evaluation of 1500
food chemicals, toxicity testing of 1502
food ingredients, end points relevance & toxicity testing of 1497
mahua oils, reproductive toxicology studies on 1495
polyols, toxicity testing of 1501
potatoes, solanine toxicity evaluation in 1315
selenium, health effects of dietary 1499
Trehalose
frozen doughs, growth condition/trehalose content & baker's yeast cryotolerance of 1340
Tribolium
castaneum, pheromone & responses of T. castaneum 1485
Tribolium castaneum
pheromones & responses of stored product T. castaneum 1484
Tribolium confusum
pheromones & responses of stored product T. confusum 1484
Trichothecenes
grains, trichothecenes in 1503
Turmeric
pickle brine, Al & decomposition control in turmeric added 1482
UHT milk
lactose hydrolysis/inactivation treatment & age gelation of UHT whole milk 1353
sodium hexametaphosphate & technology of UHT recombined milk 1358
Vegetables
frozen vegetables, temp. & microbial quality detn. in 1316
Vermicelli
mungbean vermicelli, small-scale processing of 1299
sorghum-soy flour based vermicelli 1349
Vibro
oysters, Vibrio in post-harvest shell stock 1442
Volatiles
packaging materials, volatiles in 1250
Washing
acid casein production & washing conditions 1398
fish, washing & quality of mechanically deboned by-catch 1448
Water
food, water proton NMR relaxation time measurements in 1258
Wax gourd candy
high fructose syrup & production of wax gourd candy 1334
Wheat
UP hill wheat, properties of 1286
cvs, physico-chem./milling characteristics of wheat 1283
drying/NaF & proteins of germinating wheat 1285
infant foods, development/chem./nutritional evaluation of sweet lupin/wheat/milk based 1453
Wheat flour
beta-carotene-wheat flour mixes, extrusion cooking & colour loss in 1288
doughs, formation/properties of wheat flour 1287
Wheat proteins
drying/NaF & proteins of germinating wheat 1285
Whey powder
solutions, Aspergillus oryzae lactase & lactose hydrolysis in whey powder 1400
Whey proteins
milk, proteolysis of alcohol-precipitated whey protein supplemented 1401
Wines
ethyl alcohol/glycerine GC evaluation in wines 1458
Xylose
ethyl alcohol production recombinant E. coli & xylose for 1263
Yeasts
sweet dough, invertase activity & yeast leavening ability of 1341
Yellowtail
salting/drying of yellowtail 1451
Yersinia enterocolitica
meat/meat products, Yersinia enterocolitica recovery from 1407
Yoghurts
cottage cheese, yoghurt culture performance in 1389
products, folate/pantothenic acid/biotin content of yoghurt 1402
Zinc
cow milk/infant formulas, Zn levels in 1454

COMPUTERISED DATA-BASE SEARCH AT NICFOS

The National Information Centre for Food Science and Technology (NICFOS) at CFTRI, Mysore, has developed facilities for computerised "data-base search" of the world literature in Food Science and Technology and related disciplines. Retrospective search-service facility extending upto about 20 years is available on nominal payment basis. Titles alone or with abstracts can be requisitioned as per the needs of the intending users.

Further details can be had from :

The Head
NICFOS
CFTRI
Mysore - 570 013.

NATIONAL INFORMATION CENTRE FOR FOOD SCIENCE AND TECHNOLOGY, CFTRI, MYSORE - 570 013

Also subscribe to our other periodicals

1. **FOOD DIGEST** (Quarterly)

This is oriented towards the information needs of food industries, trade and marketing personnel, entrepreneurs, decision makers and individuals engaged in food field.

Annl Subn: Indian Rs. 150/- Foreign $. 65/-

2. **FOOD PATENTS** (Quarterly)

Gives world patent information on Food Science and Technology taken from national and international sources. Abstracts are provided for food patents registered in India.

Annl Subn: Indian Rs. 100/- Foreign $. 50/-

ANNOTATED BIBLIOGRAPHIES

Aseptic packaging (1983-85)* Beet Molasses (1959-1988)* Cassava (1977-1986)* Cassava Starch (1976-1986)* Cocoa Flavour and Aroma* Cultured Milk (1977-1986)* Energy Conservation in Food and Allied Industries (12 Parts)* Ethanol Production (1976-1986)* Extruded Food and Machinery (1968-1986) 4 volumes* Food Grains (Publications of CFTRI and DFRL, Mysore)* Fumaric acid (1969-1988)* Indian sweets (1969-1987)* Instant Noodles (1970-1985)* Instant tea* Khoa (1969-1987)* Lemon juice (1978-1987)* Lemon oils (1978-1987)* Lemon pectin (1978-1987)* Papad (1969-1987)* Pomegranate (1969-1987)* Potato starch (1977-1986)* Rice and Wheat Quality (World Literature) 1987 (Rice quality 1969-1986; Wheat Quality 1975-1986)* Rice Bran and Rice Bran Oils (1970-1980) (1983)* Soy Sterols (1969-1988)* Tamarind Gums (1969-1987)* UHT-Milk (Spoilage) (1975-1988)*

The cost of each bibliography or per part or per volume is Rs.50.00. Postage is extra.

For details, please write to:
The Area Co-ordinator
FOSTIS,
CFTRI
Mysore - 570 013, India

ISSN 0253-4924

Regd. No. 36729/84

Printed and published by Director, Central Food Technological Research Institute, Mysore at CFTRI Printing Press. Editor: Shri K. A. Ranganath, CFTRI, Mysore. 570 013.